The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XIII. No. 323 AUGUST 22, 1925 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.4.0.

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.

***Editorial and General Offices*—8, Bouverie St., London, E.C.4.**

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

Trade Figures for July

THE detailed trade returns for July have now been published, and indicate that, so far as the chemical industry is concerned, there has been a general fall in the figures as compared with the same month of last year. An examination of the official statistics, which appear in another page, shows that, in keeping with the imports into the country for July, constituting the smallest monthly total since June, 1924, the imports of chemicals, drugs, dyes and colours for July has decreased by over £70,000. There is also a drop of over three times this amount on the previous month's returns. Notwithstanding that exports have also fallen as compared with the corresponding month of 1924, there has been a welcome increase of £83,169 over the figure for June. The lower figure for imports is largely accounted for by the marked decrease in the value of dyes coming into this country, which indicates that the position of the British dyestuff industry is steadily improving. But it is also probable that the present depressed state of the cotton industry is not unconnected with this reduced figure. Although the export and import returns are lower than in June, 1924, there is hope in the fact that exports are tending in the right direction by their increase over last month's total; and the relative quantities of chemical materials leaving and entering the country are very much the same as a year ago.

The summarised result of our foreign trade in July is a much reduced monthly adverse balance of trade. Whereas the average monthly imports for the latter six months of 1924 amounted to £113,500,000 and the exports similarly were £68,000,000, the respective figures for the first six months of 1925 are £112,500,000 and £65,000,000 per month. In July the exports maintained this average, but, with the reduced imports, the net adverse balance for the month was £22,500,000, whilst the previous monthly figure over the past year was £34,000,000. This improvement, if sustained, will be most helpful to our new gold standard, and much is seen to depend upon the state of the export trade. From the deliberations of the Balfour Committee on this subject, it is to be hoped that practical help may be forthcoming. The fact that chemicals have already received attention in the first published report leads us to anticipate that among the forthcoming volumes, which have been promised, there may be one which will explore very thoroughly the difficulties with which chemical exporters are faced.

Professor Cobb's New Process

THOSE who have watched developments relating to the treatment of gases in recent years must have formed the conclusion that the introduction of catalysis is likely to have a profound effect on the future of gas purification. With all modern forms of industrial gases it is the elimination of sulphur compounds of various descriptions which mainly enters into the question, and more particularly in connection with the gases derived from coal or coke which are supplied for general consumption by public utility undertakings. At the present time the operation of removing the main impurity, sulphuretted hydrogen, is necessarily intermittent owing to the fact that oxidation of the iron sulphides formed cannot be carried out with sufficient rapidity. As it stands, however, the process of purification by means of oxide of iron is almost essentially one of delayed catalysis, for after the completion of sulphiding and subsequent oxidation the purifying medium remains substantially in its original condition. It has always been held that it could be only a matter of time before a process capable of application on a large practical scale would be evolved whereby both sulphuretted hydrogen and sulphur compounds are oxidised at high velocity to sulphur, or, by carrying the oxidation a stage further, to sulphur dioxide. We recollect that some five or six years ago H. S. Taylor and

E. K. Rideal succeeded in demonstrating the possibility of such a process on a semi-technical scale, but interest in the method rather flagged at the time and little more was heard of the work of these two investigators.

Renewed attention will, however, undoubtedly be directed to the great economic possibilities of effecting rapid oxidation, by the publication recently of a specification which discloses the means whereby Professor Cobb and Mr. H. J. Hodsman propose to surmount the problem. Professor Cobb's previous method for carrying out direct purification by the utilisation of a zinc salt has on more than one occasion been drawn attention to in these columns, although little has transpired as to the results obtained with the technical scale unit which was understood to have been erected at a works in the north. In his new process, however, he is introducing a reaction which, now that we have had some years' experience of hot purification as conducted on the Carpenter-Evans principle, should involve few technical difficulties, although in the way of initial outlay it might introduce financial complications where large volumes of gas were required to be treated.

Briefly, the new process consists in securing the partial oxidation of sulphuretted hydrogen by the passage of the gas mixture (which must contain a sufficiency of oxygen) over a hot contact material such as oxide of iron. Partial oxidation follows with the result that the free sulphur formed is carried forward from the contact bed, the latter maintaining its activity, while ammonia is utilised to effect the removal of any sulphur dioxide remaining in the gas. It is in this utilisation of ammonia that the novelty of the process mainly lies, and the provision of the requisite quantity of ammonia is readily arranged for by curtailing the normal scrubbing process which takes place prior to sulphur purification. From the actual examples of gases before and after treatment which the patentees include in their specification the extent of the purification effected would seem to be remarkably complete, and it now remains for some enterprising undertaking to put what is undoubtedly an attractive process to a large-scale test.

Chemistry at the B.A. Meeting

THE annual meeting of the British Association, which is to be held at Southampton from August 26 to September 2, promises to attain at least an average measure of interest. Owing to the convenience of the meeting place for American visitors, a fair number have arranged to be present. Apart from this there will be a considerable international representation, though neither Germany nor Russia will be represented. The president this year is Professor Horace Lamb, who will in his opening address deal chiefly with certain branches of geo-physics, particularly those relating to the constitution of the earth from a physical and to some extent a mathematical standpoint. Professor C. H. Desch is the president of the Chemistry Section, which will meet in Kell Hall, and the subject of his address, to be delivered on Monday, August 31, will be "The chemistry of solids."

Although nothing bearing very directly on the fuel problem has been included in the Chemistry Section programme, some of the papers promise to be of great interest. The opening discussion on Thursday morning (August 27) is on "Surface catalysis," which should register the existing knowledge on the subject if it reveals nothing new. This will be followed by papers on "Further investigations on the photo-synthesis of naturally occurring compounds," by Professor Baly and others, on "Advances in the treatment of peat as a fuel and the production of by-products," by Dr. F. M. Perkin, and on "The distillation of cellulose and similar substances in the presence of catalysts under high hydrogen pressure," by Professor H. E. Fierz. On Friday the principal feature will be a joint discussion with the Engineering Section on "The ignition of gases." Saturday and Sunday are given up mainly to excursions and social engagements. On Monday, in addition to Dr. Desch's address, papers will be submitted by Mr. J. A. V. Butler on "The seat of the electro-motive force of the galvanic cell," Mr. E. A. Ollard on "The resistance to corrosion of electro-deposited chromium," Professor J. Reilly and Mr. D. Madden on "Velocity of decomposition of heterocyclic diazonium salts," and Dr. J. B. Firth and Mr. H. A. Fells on "Some modifications of form of sodium salts expressed from acid gel during drying." In the afternoon the members of the section will visit the Holton Heath Cordite Factory. The programme concludes with a discussion on Tuesday morning on "The alternating effects in carbon chains."

Among papers of chemical interest in the other sections may be mentioned those by Professor Ornstein on "The quantum theory of dispersion," Dr. C. H. Best on "Preparation and purification of insulin" and "Lactic acid in insulin hypoglycæmia," Dr. Frederick Walker on "The chemical composition of British quartz-dolerites," Mr. C. le Maistre on "Engineering standardisation," Mr. J. H. Shaxby on "The diffusion of suspended particles and Avogadro's number," Professor E. V. Appleton on "Some thermionic valve problems," and Professor J. J. Nolan on "Atmospheric ionisation."

Methanol Developments in U.S.A.

Two interesting facts are announced respecting methanol developments in the United States. The first is that the Customs Service, after considering a claim by American manufacturers for a dumping order against German synthetic methanol, has found as a fact that there is no dumping of methanol on the American market and that there is no evidence to justify the issue of an order. The second is that the Advisory Board of the Tariff Commission, who have been considering the application for a 50 per cent. increase in the tariff on imported methanol, have completed their report and, although its terms have not been disclosed, are understood to be divided in their opinions. No one appears to consider an advance of 50 per cent. as possible; but an 18 cent duty is mentioned as probable, and a hope is expressed that the American wood distillers, on this basis, might be able to compete favourably with the German product. On this point, it may be noted that Mr. E. Brotherton-Ratcliffe, who contributes to this issue some interesting impressions on his

recent American tour, is unable to see, on the present comparative production costs and selling prices, how the American wood alcohol industry is to survive against the German menace. Meanwhile reports are coming through from Berlin, the terms of which are not quite easy to understand, and which almost suggest that the Badische company has pushed its successes too much into the limelight and now favours a little retirement.

We have already mentioned the efforts of American alcohol interests to get into personal touch with M. Patart, who asserts a prior claim, as against the Badische company, to the production of synthetic methanol. The American view on this and other points is clearly disclosed in the current issue of *Industrial and Engineering Chemistry*, the monthly organ of the American Chemical Society :—

We assume that eventually someone versed in patent law if not indeed the courts themselves, may have to decide this controversy. The statements may be interpreted as you will, but to our minds it seems clear that to France belongs the priority. From Patart's point of view it is unfortunate that he did not make patent applications in the principal countries of the world. As it is, since those who first apply for a patent in some countries are granted the monopoly quite without regard to whether they were the originators, the Germans may be given a firm grip on the new situation.

Information reaches us that the present production of synthetic methanol in Germany is calculated at about 1,000 tons monthly, and that the Oppau plant is to go on a commercial production basis. By autumn it is expected that production will reach 2,000 tons monthly, making an estimated total for 1925 of 15,000 tons. Of this, at least one-third will be used by the I. G. and, thanks to the reduced cost of this raw material, it would give them an advantage in the cost of producing methyl dyestuffs. It is claimed that the production costs are now about 13 per cent. of the cost of methanol by the wood distillation process. Indeed, it is stated that at one plant the cost has been reduced to 3 cents per kilogram.

In some quarters the full significance of the synthesis of methanol and petroleum-like bodies from carbon monoxide and hydrogen has not been realised. At a meeting of the leaders of German chemical industry soon after the close of hostilities, the question of returning to world power was naturally discussed, and the consensus of opinion was that through chemistry there was a real opportunity to regain lost positions. If a firm grip can be established through the synthesis under discussion, it seems probable that in the not distant future the world may be compelled to pay the indemnity and to rehabilitate commercial Germany. Liquid fuels and a number of other products capable of similar synthesis still constitute dominant factors in international relations.

As showing the anxious commercial interest taken in this question in America, we learn from *Drug and Chemical Markets* (New York) that no fewer than fifty-six proposals respecting the sale or handling of methanol were received by the Badische company from the United States up to the first of July. And all were politely but firmly declined! The German chemical expert still knows his way about fairly well.

Ammonium Nitrate Explosions

A REPORT by Mr. C. E. Munroe, of the National Research Council, Washington, on two recent accidents in connection with ammonium nitrate from Muscle Shoals, recalls the investigation into the Oppau explosion which, though very complete, never definitely revealed the cause. In both these cases there appears also to be some factor not fully disclosed. In the first reported on, two carloads of ammonium nitrate from Muscle Shoals were destroyed by fire while in transportation. Each car contained 220 barrels of the material, it having been packed in new flour barrels lined with manila paper some six years previously. As these barrels, with their contents, had been standing in the warehouses for some six years, and therefore exposed to varying changes in humidity, the barrel staves had become well impregnated with ammonium nitrate, and it is thought that the fires may have been caused by the friction of these nitre-impregnated staves upon one another. Other shipments went through successfully. In the second case an explosion occurred in a nitrate of ammonia evaporating pan of the Hercules power plant, whereby one man was killed, another one slightly injured, and the shed in which the operation was being conducted demolished. The explosion occurred during the re-processing of Muscle Shoals ammonium nitrate, while the solution was being evaporated in an open cast-iron pan, fitted with steam coils. Some of the nitrate that was being re-worked had been coated, and it was thought that sufficient organic matter had accumulated from this source to form a mixture, which was explosive at the crystallising temperature, 276° to 278° F., then being used. It is estimated that from 400 to 500 pounds of nitrate were involved in the explosion, and that the explosion originated in the "heel" left in the pan.

Points from Our News Pages

Recent progress in the manufacture of paint is the subject of an article by Mr. Bearn (p. 188).

Mr. E. Brotherton-Ratcliffe speaks very highly of American industry in some impressions of a recent visit to the U.S.A. (p. 191).

An American catalyst-testing plant, installed by the firm who have acquired the North American rights in the Claude synthetic ammonia process is described by Mr. D. H. Killifer (p. 192).

The German Dye Cartel reports have been published (p. 196).

In a review of tetraethyl lead poison hazards an American expert claims that the danger has been considerably exaggerated in recent discussions (p. 197).

According to our London Market Report trade has been somewhat better this week and there appears to be a distinctly more hopeful feeling in the market. Export trade is still small but inquiry is better (p. 204).

The Scottish heavy chemical market is very quiet and no business of importance has been done (p. 207).

Books Received

THE SCIENCE OF SOILS AND MANURES. By J. Alan Murray. London: Constable and Co., Ltd. Pp. 298. 12s. 6d.

THE EXTRA PHARMACOPŒIA. Vol. II. By W. H. Martindale and W. W. Westcott. London: H. K. Lewis and Co., Ltd. Pp. 728. 20s.

The Calendar

Aug. 26 to Sept 2	British Association for the Advancement of Science.	Southampton.
Oct. 4	Société de Chimie Industrielle: Fifth Annual Congress	Paris.
Oct. 23	Engineers' Club: Annual Dinner.	Savoy Hotel, London.

Modern Developments in Paint Manufacture.—(I.)

By J. Gauld Bearn, M.Sc., A.I.C., F.C.S.

With the recognition of the importance of protecting surfaces from corrosive action has come a vast increase in the world demand for paint products and protective coverings. The remarkable developments which have taken place in the paint industry during the last decade represent the efforts made by paint manufacturers to meet and take advantage of this increased demand. These are being reviewed by the writer in two articles, the first of which appears below.

Only within comparatively recent years have the problems connected with the protection of internal and external surfaces —whether of wood, metal, or stone—from the corrosive action of the atmosphere and of various chemical fumes received the attention they deserve from scientific investigators. How serious the losses resulting from these corrosive influences are may be gathered from Sir Robert Hadfield's estimate that the loss of iron and steel due to corrosive action amounts to no less a figure than 40,000,000 tons per annum. The industry, from being carried on in early days in a more or less empirical manner, by the mixing and grinding of the selected pigments in linseed oil, has made such rapid strides forward of recent years that at the present time all manufacturing processes in modern paint works are conducted under the strictest scientific supervision in which full use is made of the most elaborate and up-to-date machinery.

By means of the highly specialised and intricate mixing and grinding machinery which is now at the disposal of the paint manufacturer, he is enabled to obtain an intimate admixture of the various paint components and also at the same time a finished product ground to an extremely fine state of subdivision. An account of the various pugging, grinding, and mixing machinery used in a modern paint works—much of which is often specially made to suit the particular purpose which the manufacturer has in view—is outside the scope of the present article, and the reader who is interested in the details of such machinery is referred to the special engineering treatises dealing with this important aspect of the subject. A passing note, however, might be made with reference to the Plauson Colloid Mill, which has recently been introduced, and which is of considerable interest to the paint manufacturer, inasmuch as it is now generally accepted that to make good protective coverings not only chemical but colloid-chemical laws must be adhered to. This mill is similar in principle to beater mills operating at high speed; but as it has already been very fully described in The Chemical Age, it is not necessary to enter into further details here. It is claimed that this mill will for many purposes replace the ordinary paint grinding mills, and that the pigment mixed with the oil, which is the dispersive medium, may be ground to colloidal fineness with a low expenditure of energy. The paints and enamels made in this manner, with colloidal pigments, possess properties which distinguish them markedly from those products made in the ordinary type of paint mills. It is found that their covering power is enormously increased, and in consequence the quantities of materials required to perform the work of painting are very much reduced as compared with the amounts formerly used. In addition it is found that these colloidal paints and enamels give on drying a much smoother coat than that given by the ordinary paints, and that such a coating is much more resistant to the action of the atmosphere.

Different Conditions of Use

The range of paint products manufactured for both decorative and protective purposes is very large and varies enormously. A paint manufacturer who is to secure and to retain his market for his finished products must to-day give careful consideration to the different conditions—atmospheric chemical, and mechanical—to which the paint will be subjected in use, and must exercise the most scrupulous care to see that each and every component used in the manufacture will be suitable for the particular purpose for which the product is intended. Thus, for example, in the preparation of paints suitable for the protection of metal surfaces from the action of corrosion, the manufacturer endeavours to use only those pigments which will have an inhibitive effect in conjunction with the most suitable elastic non-porous oil varnish mediums; on the other hand, in the case of products required for indoor decorative effects on wood or plaster, the conditions are entirely different, and he must make use of materials specially adapted and suitable for this purpose. In giving any account of the recent developments which have taken place in the paint industry it is essential to consider first of all what are the properties and composition of those paints in general use at the present time for the protection of metal and other surfaces.

The Constitution of Paints

Paints may be defined generally as liquids which contain solid particles in suspension and which are used both as protective and decorative coatings on the surfaces to which they are applied. In the manufacture of paints the solid particles, or pigments as they are generally called, are ground to an extremely fine state of subdivision in special linseed oil or mixtures of linseed oil and copal varnish mediums, a proportion of a volatile thinner such as turpentine or white spirit being added, in order to reduce the paints to a suitable consistency so that they may be spread out evenly and uniformly. When paints are applied either by brushing, spraying or dipping, the first action that takes place consists in the evaporation of the volatile medium, which leaves behind an oil pigment coating. This oil pigment coating then hardens or, as it is commonly called, dries, owing to the absorption of oxygen from the air by the oil content. The solidified oil thus produced acts as a binder for the pigments and holds them in their place. The addition of varnish, such as copal varnish, causes the paints to dry off with a bright glossy surface. When so treated these paints are known as enamel paints, or simply as enamels. Paints may also be made to dry off with flat or mat surfaces or semi-mat surfaces according to the nature and composition of the medium used in their preparation.

The time a paint takes to dry varies very considerably according to the nature of the materials used in its preparation. The rate of drying may be accelerated if required by the addition of a small quantity of siccatives or driers. Siccatives or driers are the salts or oxides of certain metals, such as those of lead, manganese, and cobalt, which possess the peculiar property when dissolved by the aid of heat in the liquid medium of causing the oils to absorb oxygen from the air, and thus increasing the drying properties of the paints. The amount of driers necessary is comparatively small as they act as catalytic agents. Liquid driers or "terebines" are also used to accelerate the drying of paints, and consist essentially of solutions of the resinates or linoleates of manganese, lead, and cobalt in turpentine or white spirit.

Paints in general are made up of the following components:

(1) Pigments.
(2) Oil and oil varnish mediums.
(3) Turpentine or other volatile spirits.
(4) Driers.

These components are incorporated in various proportions, according to the purposes for which the paints are intended, by means of powerful grinding machinery. Within comparatively recent years there have been great improvements in each of these components, and an outline of modern development in paint manufacture resolves itself mainly into a description of new or improved components. In this article a general account is given of these improvements as regards each of the constituents, but the chief developments may be at once indicated. The most important of these has been the discovery of new impermeable mediums for incorporating with the pigments, whereby the life and durability of the paints made by their aid has been increased to a remarkable extent. Only of lesser importance has been the introduction of new pigments and lake pigment colours of great permanency and stability. These pigments are affected to an infinitely less degree by atmospheric or chemical conditions than the old pigments which they have replaced. In addition, considerable developments have taken place in recent years as the outcome of the thorough investigations and research work which have been carried out on the problems connected with the drying of oils and varnishes; these have resulted in putting new and more efficient drying agents at the disposal of the

paint manufacturer. New volatile mediums have been introduced as thinners in place of turpentine in the case of special paints where the use of the latter body is not admissible.

Pigments

The chief white pigments commonly used by the paint manufacturer are white lead (basic carbonate of lead), zinc oxide, and lithopone, enormous quantities of each of which are manufactured annually for use in the production of paints of every description.

Inert white bodies such as barytes, china clay, terra alba, etc., are not really regarded by the paint manufacturer as true pigments since they are deficient in body and covering power, and hence are only used in conjunction with the true pigments as adulterants, fillers, or extenders.

Titanium White (TiO_2).—A new white pigment has been recently introduced under the name of titanium white. It is an oxide of titanium, and possesses very valuable properties as regards body, covering power, and permanency. This pigment is one of very great interest to the paint manufacturer, and will undoubtedly be used to an increasing extent in the future. A brief description of its preparation, properties, and uses is therefore given. This pigment is obtained from the mineral ilmenite, which is a compound of iron oxide and titanium dioxide (FeO, TiO_2), enormous quantities of which are found in Norway. It is only quite recently, however, that economical processes have been devised whereby this pigment can be extracted from the ilmenite ore. The process which is in use at the present time in the works in Norway where this pigment is manufactured is briefly as follows :—

The finely pulverised ilmenite is treated with hot concentrated commercial sulphuric acid, by means of which the titanium and iron contents of the ore are converted into titanium and iron sulphates. The treated mass is next lixiviated with water and allowed to settle to remove all undecomposed insoluble matter. The clear solution of titanium and iron sulphates is afterwards heated to boiling point, since this causes the titanium to precipitate in the form of titanium hydrates (meta titanic acid). The titanium precipitate is washed to remove all iron salts, neutralised by the addition of barium carbonate to remove any basic sulphates of titanium, and then dried and calcined. The calcined titanium pigment is next carefully ground, and air floated so as to yield a product of the highest possible degree of fineness and uniformity. The titanium white pigment thus produced is of an excellent white colour, and owing to its inert nature is unaffected by light and heat, and paints made with it by grinding it in an oil or oil varnish medium are exceptionally durable on exposure to severe weathering conditions or to the action of acid fumes. Titanium white paints are also noteworthy for their remarkable body and covering power, which is superior to that of white lead and zinc oxide paints; and there is little doubt that this pigment will come into much more extended use in the paint industries as its valuable properties become better known. The cost of production is still comparatively high, but when by new methods the cost of production has been reduced, it will enter into serious competition with such pigments as zinc oxide and white lead.

A Recently Improved Product

Antimony Oxide (Sb_2O_3). Another white pigment, the preparation of which has been greatly improved during recent years, is white antimony oxide. Although antimony oxide has been used as a pigment now for many years, it never obtained any real importance in paint manufacture owing to its variability in colour and texture, many of the qualities which were put on the market being quite unsuitable for use as pigments. These defects which have their origin in coarseness of crystalline texture and the presence of iron, which imparted a yellowing tinge to the pigment, have quite recently been removed, and the product which is now at the disposal of the paint manufacturer leaves nothing to be desired so far as colour, texture and body are concerned. Antimony oxide is obtained by roasting the antimony ore and condensing the antimony oxide vapours, much in the same manner as is done in the manufacture of zinc oxide. Constant scientific supervision is necessary in order to ensure that the product obtained is of a good white colour, soft in texture, and suitable for use as a pigment. The antimony oxide which is now put on the market for use as a pigment conforms to these conditions. Its specific gravity is about 5·4. When made up into paint form it has a body approximating to that of white lead paint.

It differs from the usual pigments inasmuch as it is acidic in nature, and, unlike white lead, has no accelerating action on the drying of linseed oil. Exposure tests carried out with antimony oxide paints over a period of three years show little change in colour, and indicate that this pigment has excellent wearing properties. Being a non-poisonous pigment, its use is being gradually extended as the demand for non-poisonous paints increases, and there is little doubt that should legislation be introduced into this country prohibiting the use of white lead paints an enormous demand would arise for this pigment. Antimony oxide paints unfortunately possess the defect of drying with somewhat softish films, and, if the drying be unduly prolonged, dry off without any gloss. After much patient investigation it has been found, however, that the addition of a proportion of zinc oxide, varying from 10 to 25 per cent., together with about 2 per cent. of cobalt linoleate drier, gives remarkably good results, and overcomes the above-mentioned defects.

Paints for External Work

Leaded Zinc Oxides. Various leaded zinc oxide pigments which are exclusively manufactured in the U.S.A. have been introduced into this country in increasing quantities of recent years, and have been used with considerable success in the manufacture of paints for external work. They are a fumed product of metallic zinc and lead and made on the same principles and methods as those employed in the manufacture of zinc oxide by the direct process. Their composition varies considerably, but is roughly as follows :

Zinc Oxide	75 per cent.
Lead Sulphate	25 per cent.

Paints made from these products have greater density and better hiding power than those made from a mechanical mixture of zinc oxide and sulphate of lead. In addition, the result of fuming these pigments in one operation greatly minimises the tendency of cracking and scaling, which is so characteristic of straight zinc paints or paints made with a large percentage of zinc oxide.

Sublimed White Lead. This pigment is also chiefly manufactured in the U.S.A., where in recent years it has been extensively used in the production of various agricultural paints in the place of white lead. It has, however, up to the present not been imported into this country to any great extent, although a considerable amount of experimental work has been carried on here with a view to determining its efficiency as a suitable pigment for paints which are to be subjected to severe climatic conditions. The approximate composition of sublimed white lead is as follows :

Lead Sulphate	75 per cent.
Lead Oxide	20 per cent.
Zinc Oxide	5 per cent.

Sublimed blue lead, another pigment largely used in America, has a greyish blue colour, and has approximately the same composition as sublimed white lead. It has recently been used with considerable success in the manufacture of priming paints for use on iron and steel structures, and has been found to possess excellent anticorrosive properties.

Non-Setting Red Lead. The successful production of a non-setting red lead is one of the recent noteworthy developments in the paint industry. Red lead paints are generally recognised as being unequalled for the protection of iron and steel structures from the action of corrosion Unfortunately, however, red lead (Pb_3O_4) suffers from the defect, when made up into paint form with linseed oil, that it rapidly hardens and becomes useless. This is due to the fact that the basic red lead pigment saponifies the linseed oil medium with which it is mixed, and combines with it to form hard insoluble lead linoleate soaps. For this reason these paints had formerly to be made up just before use. Lately lead manufacturers have introduced non-setting red leads on to the market. From these non-setting materials the paint manufacturer is able to make up paints which will stand for months without hardening, and only require a little stirring to make them ready for use.

Lake and Pigment Colours

The immense advance which has taken place during the last few years in the development of the dye industry, with especial reference to the manufacture of dyestuffs suitable for the production of lakes and pigment colours, has been of great service to the paint manufacturer, who has now at his disposal a large range of bright colours of every conceivable shade and hue,

all of which possess great fastness to light and stability as regards the action of alkalies and other chemical agencies. By the aid of these colours he has been enabled to produce paints for decorative and other purposes where brilliancy of hue and permanency are essential which would have been impossible in the early days of the paint industry. The bulk of these permanent lakes and pigment colours was exclusively manufactured before the war by the various large German aniline dye firms, now grouped in one huge combine known as the E.I.G. (Erweiterte Interessen-Gemeinschaft). These dyestuffs were imported into this country to be made up into lakes and lake pigment colours for use in the paint and printing ink industries. At the present time a considerable quantity of these dyestuffs is still imported from Germany under licence or as reparation dyestuffs. The French occupation of the Ruhr threatened to cut off this supply, but as, fortunately, the manufacture of many of the more important and most extensively used of these colours is now being successfully carried on by the British Dyestuffs Corporation and other colour firms in this country, no great inconvenience was felt. It is to be hoped that in a few years the paint industry will be quite independent of continental supplies.

The list of dyestuffs which is now available for the manufacture of lakes and pigment colours is a very long one. Of those which have been more recently introduced, and which are extensively used on account of their brilliancy and permanency, mention should be made of Lithol Red (Monolite Red R), Alizarine Delphinol, Durasol Acid Blue, Hansa Yellow, Helio Fast Rubine R.L., Fast Scarlet R (Monolite Fast Scarlet R), Helio Bordeaux B.L., Algole Blue 3 R. Many of the newer and most permanent dyestuffs are pigment colours which are insoluble in water and do not require to be precipitated in the usual manner, but are simply mixed with the substrata and ground, when they are ready for use.

Laboratory Garments and Equipment

BOTH to the research chemist who works in the laboratory and to the superintendent of large scale factory processes the question of suitable clothing is an important one, and the list of laboratory garments issued by A. Gallenkamp and Co., Ltd., 19-21, Sun Street, Finsbury Square, London, of their "Technico" products will be useful. These jackets and aprons are made in white drill and khaki, and various types are provided to suit particular needs. Those who have worked with chemicals in any capacity will realise the importance of suitable clothing in this connection, and it would be difficult to estimate the loss incurred through want of this simple precaution. Dusters, glass cloths, and "Acme" polishing cloths are also included in the list, which announces also a variety of other laboratory equipment.

Copper-coated glassware is among these products, and combines the advantage that heat applied is quickly distributed over the bottom of the vessel, with the saving of liquid in the event of the glass cracking. Beakers and flasks are made in this form, and also such apparatus as jacket tubes for Victor Meyer vapour density determinations. Graduated glassware, burettes and pipettes, are among these products, and this pamphlet also describes analytical weights, as well as a new pattern "Geryk" vacuum pump of the rocker type, for use in the laboratory.

A Smoke Abatement Conference

THE increasing interest in the problem of securing a purer atmosphere with its resulting benefits will receive a further impetus from the Smoke Abatement Conference to be held at the Palace Hotel, Buxton, in the autumn. This meeting, which is in the form of a "Smoke Week-end" from Friday evening, October 2, to Monday morning, October 5, is being arranged by the Smoke Abatement League of Great Britain. Certain practical proposals for reducing both domestic and industrial smoke are being prepared by the League for full consideration by those attending, and prominent authorities have agreed to open the discussion at the various sessions. It is hoped that a constructive programme of useful work will be framed, the results of which can be reviewed at the Smoke Abatement Exhibition and Conference at Birmingham in 1926. The headquarters of the Smoke Abatement League are at 33, Blackfriars Street, Manchester.

The Coal Situation

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with interest the leading article under the above heading in your issue of the 8th instant, and would be glad if you would permit me to make a few remarks in reply.

It appears to me that the chief difficulty in arriving at any satisfactory settlement of the wages trouble in the coal industry is that the political element is in the ascendant, and the Miners' Executive is more concerned with advancing their claims for nationalisation "under workers' control" than they are for dealing with the present situation as the economics of the industry demand. Mr. Baldwin has merely bought a temporary respite, and by abandoning his previous *non-possumus* attitude towards the question of a subsidy—upon the threat of a general strike—he has unconsciously done an amount of injury to the coal industry that is not to be measured by the estimated cost of the subsidy itself.

Sir Alfred Mond we all know to be a clever man in his own line of business, but that does not necessarily constitute him an authority on mining matters. It is so easy to talk about improved methods, labour saving devices, better technique, etc., but it is not the lack of these to which the present parlous condition of the coal industry is due. The trouble is world-wide, and in Germany and America the same difficulties are being experienced, and the same criticisms are being launched against the leaders of the coal industries in those countries.

Regarding the suggestion that the better organised collieries should be pooled with the less efficient, that does not really bear a moment's consideration, for, why should the shareholders in a prosperous undertaking be deprived of their legitimate profits for the benefit of some less fortunate investors, and under what legal powers could the directors thus deal with their moneys? In any trade, business or industry, inequalities are inevitable, and if you deprive the best organised and most efficiently managed concerns of their merited rewards, you remove all incentive to the maintenance of their standards and level them down to the standard of the lowest.

The figures relevant to the difference between pithead price of domestic coal and its cost delivered into the householder's cellars have been published over and over again during the past two years. It has been demonstrated beyond controvertion that the transport, labour and general expenses of handling such a bulky material accounts for the seemingly undue disparity.

Taking the London retail trade as a whole, there is no necessity of life that comes into our homes upon which the profits of the distributors show such a small percentage as coal.—I am, etc.,

A. E. RITCHIE,
Late Managing Director, Snowdown Colliery, Ltd.
57, Clarence Gate Gardens, N.W.1.
August 18.

A Nitrate Fusion

THE shareholders of the Santa Rita Nitrate Co., Ltd., have now been notified, following the chairman's statement at the meeting on June 25 that negotiations were in progress for the acquisition of a further property, that it is the San Patricio Nitrate Co., Ltd. It is proposed to take over the whole undertaking and its assets, except that the vendor company reserves the sum of £5,000, which presumably represents the statutory reserve. The San Patricio undertaking has lost its right to an annual productive quota, and, in view of the fact that free selling may be reverted to after June, 1927, it is reported that the directors do not consider themselves justified in recommending the increase of working capital that would be necessary for the purpose.

The San Patricio has an issued capital of £100,000, its balance sheet as at June 30 last shows properties and stocks to the value of £103,000, with total assets of £121,000, and in recent years it has been a steady dividend-payer. It will be necessary to increase the Santa Rita Nitrate Co.'s capital from £100,000 to £125,000, and an extraordinary meeting has been convened for August 25 to approve this increase, and confirm the provisional agreement already entered into with the San Patricio Company.

Impressions of American Industry

By E. Brotherton-Ratcliffe

We are indebted to Mr. E. Brotherton-Ratcliffe, principal of Brotherton-Ratcliffe and Co., London, for the following notes on American chemical industry based on a recent extensive business tour in the United States.

AFTER a business tour in the United States, perhaps the most lasting impression concerns the remarkable optimism and air of well-financed prosperity so apparent in American business circles.

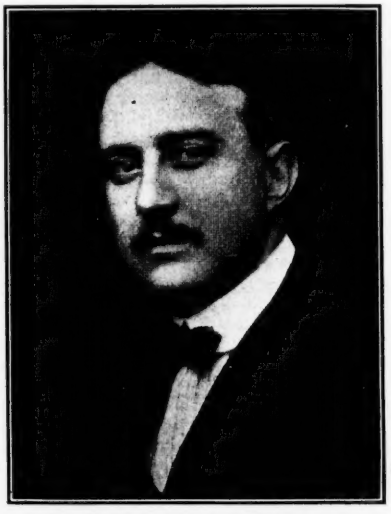
This encouraging spirit, confirmed by plentiful capital and unhampered by unemployment or wage difficulties, permeates the whole country, although some sections of chemical industry are not experiencing unqualified prosperity.

Wages are very high, there is relatively no unemployment, and business as a whole is much ahead of our conditions.

Home business in chemicals I found to be good, but importers have done very little since the tariff restrictions. Indeed, they have lost in the last two years, consumers finding that it is cheaper to buy spot in New York.

Dye Market Unhealthy

The dye market I found to be unhealthy—suffering from over-production and consequent low prices and unremunerative returns. Plants have been raised too rapidly, and expansion has been out of proportion. Consequently ruling prices are far from profitable, and it would appear inevitable that the leading companies will gradually absorb smaller concerns.



MR. E. BROTHERTON-RATCLIFFE

It is more than likely that an amalgamation will take place between the three important chemical firms, the Du Pont, the National Anilin, and the Newport Chemical Works, with the Du Pont holding the ruling interests.

The Du Pont Company is probably the most enterprising chemical concern, and is carrying out extensive research in every field. Their recent experiment with the "Ethyl" ship for extracting bromine from sea water was, I understand, quite successful.

Great Scope for Chemists

Research is so extensive that there is tremendous scope for British chemists in America, including young men only recently qualified. The field is so great and the resources so unexploited that possibly no other country in the world offers such opportunities to chemists who can adapt themselves to the conditions.

The outstanding question of the day is the production of synthetic methanol by Germany at a price that will kill the American wood alcohol industry in which some 100,000,000 dollars are invested. An attempt is being made to raise the duty on the imported product by 50 per cent. The Tariff Committee is at present investigating the matter, but even if they recommend this increase and the President authorises it, the wood alcohol industry can hardly survive because German plants would soon be operating in America. It is claimed that the cost of manufacture of wood alcohol in America exceeds 70 c. per gallon, while the German synthetic product can be landed in New York duty paid at 47 c. Therefore, even though the tariff were raised, it is difficult to see how it could save the home industry.

Another important enterprise is the manufacture of acetic acid in America by a synthetic process from acetylene gas. The movers in this matter are the Roessler and Hasslacher Chemical Co., the Shawinigan Water and Power Co., and the Union Carbide and Carbon Corporation.

German Industry Depressed

There has been talk of the German entry into the American dye market, but Germany stands no chance in American markets save in the case of a few special dyes not made by home producers. Incidentally I found, during a visit to Homburg, that German industry is in a very depressed state. They are hampered by lack of capital and credit. Unemployment is general, and the standard of living very low. The dye market is in a bad way. Exports are down and imports up. Many plants are not paying, and a general revival in neutral markets is needed before Germany can recover.

Preservatives in Food

A CIRCULAR No. 192 issued by the Ministry of Health relates to the Public Health (Preservatives, etc., in Food) Regulations, which provide for the prohibition of the importation and sale of articles of food to which preservatives and other specified substances have been added. The Regulations in terms give co-ordinate jurisdiction to the officers of Customs and Excise and to local authorities, but it has been arranged that, so far as meat and fish and their products are concerned, the enforcement will normally be left to local authorities and their officers, while officers of Customs and Excise will normally enforce the Regulations so far as they apply to other articles of food.

Attention is drawn in the circular to Article 7, which empowers a local authority, instead of or in addition to taking proceedings against a retailer, to take proceedings against the manufacturer or wholesaler by whom the article was previously sold. It is suggested that this provision might be used with advantage in many cases where an article of food is sold in a sealed container bearing the name and address of the manufacturer or of the wholesale dealer responsible for its distribution.

Danger in Boric Acid

Professor W. E. Dixon, Reader in Pharmacology at Cambridge University, and late Professor of Materia Medica and Pharmacology at King's College, London, in discussing the use of chemical preservatives in food, said that the regulations aimed primarily at providing the country with a cleaner and purer food, and, secondly, at excluding from foodstuffs certain objectionable substances, harmless enough though they might be in occasional doses, but cumulative when taken regularly. In making the regulations the Minister was bringing the country in this respect up to the pure food standard existing in America and most European countries. The use of preservatives was a relatively easy method for the manufacturer to ensure the keeping qualities of his wares, but in many cases cleanliness had the same effect. For example, why should certain cider manufacturers insist on the necessity for chemicals when others, including some of the largest, by using methods of cleanliness, avoided them altogether? The complete prohibition of boric acid which would ultimately come into force he regarded as a great benefit to the nation. The fact that all people retained in their tissues throughout life that most insidious substance, and that few took less than eight grains daily—many much more—should in itself be disquieting, but when it was known that boric acid could produce alimentary and renal disease the desirability of its prohibition was conclusive. Much of the time of the Committee was spent in investigating the effect of the prohibition of preservatives on the prices of foods, and they satisfied themselves that all their recommendations could be carried out without increasing the cost.

Catalyst Testing: Notes on an American System

By D. H. Killifer

The author describes in an article in "Industrial and Engineering Chemistry" a catalyst laboratory organised by Lazote, Incorporated, in connection with the working of the Claude process under the North American patent rights recently acquired by American interests.

SYNTHETIC ammonia has not been America's forte, but there are many indications that leadership in this field, as in many others, may be acquired by the co-operation of American brains, American capital, and American technical skill. The latest entrant into this field is Lazote, Incorporated (an organisation formed by E. I. du Pont de Nemours and Co., together with other interests), which has acquired the North American patent rights to the Claude process for the ammonia synthesis, and will develop it under American conditions. Lazote, Incorporated, has a 25-ton per day plant now under construction at Charleston, W. Va.

Purpose of Plant

In order to study the various catalytic problems which are peculiar to the synthetic ammonia process, Lazote has installed a catalyst laboratory at the Experimental Station of E. I. du Pont de Nemours and Co. at Wilmington, Del., which embodies many interesting features, and is, in many respects, unique in its field. A principal part of this laboratory is the high-pressure catalyst-testing plant, the purpose of which is to test a wide variety of catalysts for the reactions between nitrogen and hydrogen under a diversity of conditions. It is occupied principally in determining the activity and longevity of these materials under variations of conditions which parallel as closely as possible those met in commercial operation. The chief operating variables which this installation is equipped to study are temperature, pressure, gas flow, and purity of the gas mixture. It is possible to use reaction temperatures up to 800° C., and the pressure may be varied from atmospheric pressure to 1,000 atmospheres or above. The present installation permits gas flows as high as 2,000,000 space velocity (space velocity being defined as unit volumes of gas, measured at one atmosphere pressure and 0° C., passing through unit volume of catalyst per hour). Special arrangements are made for the introduction into the synthesis system of the gaseous impurities most often met in practice, such as carbon monoxide and methane. The installation is equipped with ten catalyst furnaces, which may be operated either in parallel or in series, thus permitting the testing of the same or ten different catalysts at once under a variety of conditions of pressure, temperature, and gas flow. The plant is particularly adapted to carry out catalyst testing for ammonia synthesis, but it may easily be converted to the testing of catalysts for other gas reactions.

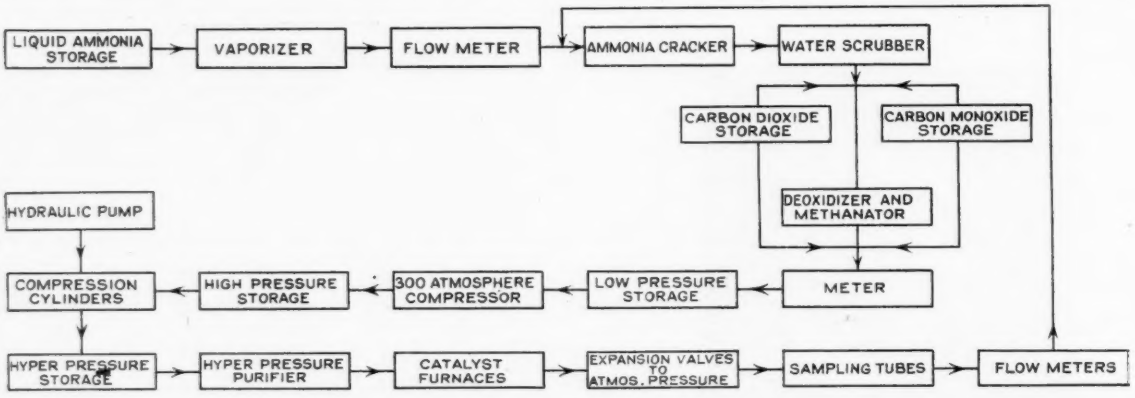
Flow Sheet of Catalyst-testing Plant

The accompanying flow sheet of the catalyst-testing plant will make clear its method of operation. The principles employed in its construction and operation follow those developed in catalyst testing at the Fixed Nitrogen Research Laboratory.

The mixed hydrogen and nitrogen are supplied through a train of apparatus. The first operation is the decomposition of ammonia, which gives at once a nitrogen-hydrogen mixture in the ratio of 1 : 3. Liquid ammonia is supplied from three cylinders connected to a header in such a way that any or all of them may be brought into the system as desired and for convenience in replacement of empty cylinders. From the cylinders the liquid is conducted to a steam-heated expansion chamber consisting of a 76-mm. (3-inch) iron pipe surrounded by a steam jacket. This is done to prevent cooling the lines to such an extent that liquid ammonia instead of gaseous ammonia would pass through the expansion valve. This expanded ammonia is then passed through an orifice flow-meter to the ammonia cracker.

Ammonia Decomposition

The ammonia cracker consists of three concentric iron cylinders connected in such a way that gas passing through them must pass longitudinally through each in turn. The whole is carefully jacketed to reduce radiation losses and is heated by a coiled nichrome wire in the centre of the combination. The ammonia is first passed up through the outer cylinder to preheat it, then downward through the cracking catalyst, and finally upward past the heated nichrome wire in the centre cylinder. The cracking catalyst consists of porous iron. The temperature of the iron catalyst is about 600° C., and that of the nichrome wire heater over which the gas passes out about 1000° C. In passing through this cracker the ammonia is at approximately atmospheric pressure, and is decomposed almost entirely. The gases passing out of the cracker contain less than 1 per cent. of ammonia, and flow next through a water scrubber, where this residual ammonia is removed.



The gas is then passed through a deoxidiser, which is similar to the ammonia cracker in all respects except that the flow of gas through it is reversed and iron is replaced one-half by copper and the other half by nickel. The copper is in the form of turnings; the nickel is in the form of methanation catalyst. The materials in the deoxidiser convert any free oxygen in the gases to water; the nickel catalyst serves to methanate any carbon monoxide or carbon dioxide that might be present.

Control of Impurities

In addition to the source of nitrogen-hydrogen mixture, the gas supply train has connected to it, through flow-meters, cylinders of carbon monoxide and of carbon dioxide, so arranged that either or both may be added to the gas before or after its passage through the deoxidiser and methanator. This makes it possible to secure in the reaction mixture any desired percentage of carbon dioxide, carbon monoxide, or methane. Obviously, these cylinders may be replaced by cylinders of other gases for introduction of other gaseous constituents.

The entire system so far described operates at atmospheric

pressure, or, at most, under a few inches of water, to insure flow. The storage for the gases at atmospheric pressure consists of two water-sealed gasholders of 14,000 and 28,000 litres (500 and 1,000 cubic feet) capacity. These holders are arranged to be used either singly or together and each is provided with a full and empty alarm. From them is drawn the supply of gas for the high pressure system, and the compressor is connected to the gas holders in such a way that it is possible to pump from one to the other, to circulate the gas mixture in one of them for purposes of mixing, or to pump from either or both to the high-pressure system.

High and "Hyper" Pressure Systems

The gas in the low-pressure holders is withdrawn by a four-stage compressor of standard design, which delivers the gas to barricaded high-pressure storage at 300 atmospheres. A vacuum alarm is placed in the line from the gas holders to this compressor to warn the operator in case the supply line is not clear. The high-pressure storage consists of sixteen gas cylinders, each of 28·3 litres (1 cubic foot) capacity. These are arranged on four headers of four cylinders each, which makes it possible to use them in blocks of four. This high-pressure storage supplies gas at 300 atmospheres to the hyper-pressure system. (The term "hyper-pressure" was first used by Claude to describe the pressure under which his synthesis operates.) This hyper-pressure system makes it possible to compress the gas to 1,000 atmospheres and above. The method of producing these high pressures consists in running gas at 300 atmospheres into a forged steel cylinder and then pumping water into the bottom of the cylinder until the desired pressure is obtained. Maintenance of pressure during withdrawal of the hyper-compressed gas is carried out in the same way. Two compression cylinders are provided so that they may be used alternately, thus permitting close regulation of the gas pressure and continuous flow of the hyper-compressed gas. They are mounted on a solid steel block in which are machined channels for water flow and in which valves are mounted so that water from the hydraulic system may be pumped into either one, and by which either cylinder or the hydraulic pump itself may be connected to the drain. Connections are made to the tops of these cylinders so that either or both may be connected at will to the high-pressure storage or to the hyper-pressure storage. The hyper-pressure storage consists of two similar cylinders connected in series at the top and floating on the line leading to the catalyst furnaces. Drain connections are provided at the bottoms of these storage cylinders so that any water passing over from the compression cylinders may be vented readily without getting to the catalysts. The compression cylinders and the hyper-pressure storage cylinders are enclosed in a barricade of a 6-mm. (¼ in.) steel plate.

The hydraulic pump used is a standard three-cylinder design modified to meet the special conditions. The pump operates single-stage with the three cylinders in parallel, and is capable of delivering 1·64 litres (100 cubic inches) of water per minute against a pressure of 1,000 atmospheres. It is driven by a variable speed motor connected through a chain and gear drive.

All piping for gas under hyper-pressure is seamless steel tubing 1·5 mm. (1/16 in.) internal diameter and 4·5 (3/16 in.) external diameter. On account of the danger of these small tubes flying around and hitting some one if a break should occur, they are carried in steel channel or other supports, and are fastened to these supports at frequent intervals. At every point in both the high- and hyper-pressure systems where connections are made, valves have been placed so that in case of leakage or accident only a small volume of gas need be lost. The valves used in this hyper-pressure system are machined from solid blocks of machine steel and are of the needle-valve type. The needle is case-hardened and arranged to give a line seating against the softer machine steel body, rather than surface seating as is usual. The unions used to hold the hyper-pressure are similar in principle to the valves, i.e., are arranged to give line contact between the female part of the union, which is made in the form of an interior cone of 60°, and the male part, which is a frustrum of a cone of some 50° or less. A closely fitting steel sleeve is placed over the male connection and carefully soldered to the tubing that is to be joined. Silver high-temperature solder is used in making connections between the tubing and other fittings.

From the hyper-pressure storage cylinders the mixed gases pass to the hyper-pressure purifier unit. This unit operates on the same principle as that of the deoxidiser and methanator in the atmospheric pressure train, but is much smaller. It consists of a chrome-vanadium steel tube of 25 mm. (1 in.) outside and 12·5 mm. (½ in.) inside diameter and nearly a metre long. This tube is mounted vertically in a standard 46-cm. (18-in.) electric tube furnace and contains copper turnings followed by a methanation catalyst. The gas passes downward through this tube and then through a water-cooled coil and separator to remove any water from the gas. The purifier operates at 350° C.

Catalyst Units

From the hyper-pressure purifier the gases pass to a header leading through valves to the ten catalyst units. Each of these may be operated independently. They consist of 60-cm. (24 in.) chrome-vanadium steel tubes of 25 mm. (1 in.) outside and 6·25 mm. (¼ in.) inside diameter, mounted in standard 30·5 cm. (12-in.) electric tube furnaces. The middle section of each tube contains the catalyst under test and is surrounded by a copper slug fitting snugly around the tube and in the furnace. This copper slug is used to insure uniform heating of the catalyst and is provided with a keyway next the tube for the insertion of a thermo-couple. Arrangements are also made for measuring catalyst temperature by means of a pyrometer well passing through the catalyst. The gas mixture passes upward through the catalyst and after reaction is released to atmospheric pressure through an electrically heated slow-acting valve at the top. Each furnace is supplied with a water-cooled coil, which may be used to separate liquid ammonia from the exit gas if desired. When tests are to be made at high temperatures and high pressures, the chrome-vanadium tubes are replaced by a special alloy.

The slow-acting valves between the hyper-pressure in the catalyst furnaces and the atmospheric pressure at which the gases are analysed and returned to the system are interesting. The valves themselves are similar to the other hyper-pressure needle valves of the system, but instead of being operated directly by a handle, as in other cases, they are controlled by long levers actuated by hand-operated screws. This makes possible accurate control of the outflowing gas and is essential on account of the great pressure difference between the two sides of the valve. They are heated above 132° C., the critical temperature of ammonia, to prevent condensation.

Each of the catalyst furnaces is placed in a separate compartment of a steel flame-deflecting system, to prevent fire damage in case a tube gives way. In the cases so far observed, the failure of a tube has resulted in a comparatively small flame, so that the precaution goes farther than is necessary. The other barricades around the plant are, like the furnace barricade, designed rather for flame deflection than for explosion resistance, which would be more difficult to attain. Explosion dangers have been minimised by attempts to make the working of the plant convenient and uniform, as well as by paying particular attention to alarm and other devices intended to make every operation fool-proof.

Analysis and Control

From the catalyst furnaces the released gases at atmospheric pressure are passed to the analysis bench. Here samples are drawn through boric acid solution containing bromophenol blue and then into a compensated buret. The gas volume is measured and the ammonia absorbed is titrated and its percentage calculated. From flow-meters the gases are passed back into the system again just ahead of the ammonia cracker.

All the controls of the hyper-pressure system are centred on a pair of control boards within easy reach of a single operator. The valves controlling the operation of the hydraulic pump, as well as those regulating the hyper-pressure storage cylinders, are mounted on the surrounding barricade. The leads from all the pyrometers, the rheostats and ammeters for controlling the temperatures of the catalyst furnaces, and the hydraulic pump motor controller are mounted together on the electrical control board. Temperatures may be measured either by the potentiometer method, by a standard millivolt meter, or by attaching the thermocouple to a recording pyrometer. For convenience in operating, Bourdon-tube gauges are used in regulating the hyper-pressure compression cylinders, but

the pressure on the gas as supplied to the catalysts is measured by a mercury gauge. All gauges are tested periodically against an apparatus of the dead-weight type, which is used continuously during the more important observations. The control of gas flow through the catalyst furnaces is carried out on the analysis bench. The nitrogen-hydrogen mixture circulating through the plant is continuously analysed by a recording apparatus of the thermal conductivity type.

The accuracy of the control of all factors under test in this plant assures the value of the results obtained from it. Already its quantity production of accurate results is making itself felt. There is much in the methods here employed which might well be applied to other industries, even though they seem completely unrelated.

Chemical Industries of Hungary

Output in Excess of Demand

In a report on the commercial and industrial situation in Hungary prepared by Mr. E. C. Donaldson Rawlins, commercial secretary to H.M. Legation, Badapest, for the Department of Overseas Trade (H.M. Stationery Office, 1s. 6d.), the following notes on the chemical industries of the country appear :—

Fertiliser and Oil Industries

The consumption of artificial fertilisers on the territory of present Hungary amounted to about 160,000 metric tons annually in pre-war times, and the capacity of the three local factories engaged in its manufacture is about 180,000 tons, or slightly more than the average demand. The consumption in 1924, however, was only 6,000 wagons. For the manufacture of bone fertilisers about 25,000 tons of bones can be consumed annually, but at present not more than 5,000 tons are locally available. Hungarian glue is an important export commodity, and not more than one-fifth of the production can be disposed of in the home market. Over 1,000 tons is annually exported.

The mineral oil refineries are encountering difficulties because the countries (Roumania and Poland) which formerly supplied the crude oil have prohibited its export. The necessary raw material is now obtained from Russia. The home market could absorb 70,000 tons of crude oil annually, but because of imports of refined products from Roumania and Poland the local refineries did not dispose of more than 30,000 tons in 1924. The seven modern refineries could deal with over 200,000 tons of oil, but under present conditions were able to employ only 900 men. The value of the local production was 9 million gold korona, while imports reached a value of 12 million gold korona.

Over-Production of Industrial Gases

Gas and by-products are produced at the Budapest city gasworks, and, on a small scale, in provincial towns. Considerable quantities are available for export after all home requirements have been met in regard to liquid ammonia, sulphate of ammonia, pitch, and tar oil. The development of brown coal distillation has opened new possibilities. Oxygen, liquid carbonic-acid gas, liquid air, and other industrial gases are produced by a number of factories all belonging to the same group. Their capacity is far in excess of local requirements, but exports are at present difficult. The 13 factories now working employ about 2,000 hands, and the output for 1924 was in the vicinity of 20,000,000 gold korona. Improved export business is hoped for when commercial treaties have been concluded with Roumania, Yugoslavia and other adjacent countries. Coal tar of Hungarian origin is used largely for the manufacture of roofing material and a few simple products of distillation. Export trade is anticipated when commercial treaties have been concluded.

The cement industry provides employment for over 2,300 hands in seven factories with an output of about 30,000 tons per annum, or less than half of their capacity. The value is given as 7,500,000 gold korona, while exports in 1924 amounted to 300,000 gold korona.

Starch, dextrin, and glucose are produced in large quantities from wheat, potatoes, maize, and rice, although in 1924 the production was not more than about 10,000 tons, or one-third of the normal capacity of the seven factories engaged ; 450 hands were employed, and the output was valued at 3,500,000 gold korona ; 2,000 tons, worth about 1,000,000 gold korona, were exported.

Too Many Alcohol and Soap Works

Alcohol is produced in five large factories, but during 1924 only 10 per cent. of their capacity was utilised ; 7,000 tons, valued at 3,500,000 gold korona, were exported. The soap industry is over-developed with about 110 factories in operation of which 10 are large, 30 of average size, and the remainder of little importance. The productive capacity is about 20,000 tons, while the annual local consumption is only 10,000. Exports in 1924 were valued at about 300,000 gold korona. Candles are made in three large factories and 10 small works.

Paints, colours, dyes and ink are manufactured by 22 different firms. Exports reached 500,000 gold korona. Three large rubber factories employ 1,800 men and export goods to the value of 2,000,000 gold korona.

Artificial silk was produced to the extent of 10,000,000 gold korona in the factory at Sarvar. A new factory at Magyarovar will commence operations in 1925. Six million gold korona was obtained for exported goods.

During 1924, Hungary imported 5,000 metric tons of caustic potash, of which, however, only 5 per cent. came from Great Britain. The country also imported 2,800 metric tons of sulphuric acid and 4,800 metric tons of coal-tar oils, none of which proceeded from Great Britain. Of Hungary's imports of coal-tar dyestuffs in 1924, out of a total of 6,878 quintals, 79·7 per cent. was supplied by Germany, 10·88 per cent. by Austria, 4·78 per cent. by Czecho-Slovakia and only 0·17 per cent. by Great Britain.

Benzoic Acid or Boric Acid

Professor Armstrong's Experiments

Professor H. E. Armstrong, writing on " Preservatives in Food," in *The Times*, inquires why benzoic acid should be allowed and not boric acid. Describing an experiment with these substances, he states :

" I asked my local druggist to make up two 1 per cent. solutions for me—one containing one gramme of boric acid in 100 cubic centimetres of distilled water, the other a like solution of benzoic acid. Two bottles were sent to me—the one a cold, clear liquid, the boric solution ; the other was still warm, and crystals of benzoic acid were floating in the liquid. I had not considered the solubility of this acid. I filtered the latter through a plug of cotton wool into a small tumbler, and poured the boric solution into a similar tumbler at its side. I then picked from a spotted Japanese laurel (*Aucuba*) bush, at my doorstep, two terminal tender baby leaves at the end of a shoot, and two other terminal leaves of maturer growth. At 1.45 I placed one of each kind of leaf in each of the tumblers. Gradually a few crystals separated from the benzoic solution, showing it to be saturated. At 4.15 it was already clear that the benzoic acid was entering into and poisoning the baby leaf, as several small black patches were to be seen on its surface. These continued to spread and at 11 p.m. were quite large. The maturer leaf showed but a black dot or two. The baby leaf in the boric solution was scarcely affected—it showed two or three fine black streaks. This morning, at 8 a.m., the baby leaf in the benzoic solution was two-thirds blackened ; the maturer leaf showed several black patches of moderate size. The black streaks on the baby leaf in the boric solution were slightly more obvious. On the evidence of this single experiment it is clear that the benzoic acid is far the more toxic. It is as I expected : the less soluble substance is the more active."

Professor Armstrong, in conclusion, suggests an appeal " from the court below " to himself, to Professor Drummond, of University College, and to the managing director of the British Dyestuffs Corporation, " all persons skilled in inquiry such as should be undertaken, but never yet has been, to ascertain the truth as to the action of the substances that have been, or may be, used as preservatives."

Antifriction Grease for South Africa

The Administration of the South African Railways and Harbours is inviting tenders to be presented in South Africa by October 22 for the supply at various points of approximately 32½ tons (2,000 lb. each) of antifriction grease. United Kingdom firms interested in the matter can obtain further particulars upon application to the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1.

Chemical Trade Returns for July

Figures Lower Than Last Year

THE value of imported chemicals, drugs, dyes and colours for July was £1,073,018, which is a decrease of £73,392 on the corresponding figure for last year, and of £222,926 on the previous month. The exports are valued at £2,034,635, a decrease of £172,822 on the figures for July, 1924, but an increase of £83,169 on the total for June.

It will be seen in the returns below that a marked decrease has taken place in the import of calcium carbide, coal tar products, and potassium compounds (other than saltpetre), and even more so in the case of sodium nitrate, which has dropped by £20,000. The import of dyes and dyestuffs has decreased generally, as also have tanning extracts. A remarkable increase, however, is recorded in nickel and zinc oxides, and in sodium compounds except nitrate, which has greatly decreased.

Among the exports a noticeable decrease has occurred in ammonium sulphate to Italy, Spain, and the Canaries, but this is more than balanced by the increase to Japan, British West India Islands, and other countries. The export of tar and creosote oils has increased, as also zinc oxide and certain painters' colours and materials, but the figures are generally lower than last year, though showing an increase over the previous month.

Imports

	Quantities. Month ending July 31.		Value. Month ending July 31.	
	1924.	1925.	1924.	1925.
			£	£
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Acetic .....tons	600	634	27,874	30,486
Acid Tartaric.....cwt.	4,690	5,550	25,166	27,223
Bleaching Materials ,,	8,617	8,087	9,123	7,878
Borax..... ,,	4,903	10,942	5,910	12,942
Calcium Carbide... ,,	88,312	58,559	57,948	43,170
Coal Tar Products .value	—	—	49,158	37,469
Glycerine, Crude...cwt.	706	336	1,758	742
Glycerine, Distilled ,,	64	145	306	525
Red Lead and Orange Lead..... ,,	3,410	2,669	5,818	4,028
Nickel Oxide ..... ,,	2,222	4,105	11,416	21,109
Potassium Nitrate (Saltpetre) ..... ,,	3,465	3,981	3,996	4,865
All other Potassium Compounds .... ,,	127,275	47,521	36,604	28,958
Sodium Nitrate.... ,,	41,247	10,788	26,782	6,813
All other Sodium Compounds .... ,,	29,114	43,278	22,789	28,519
Tartar, Cream of... ,,	5,774	5,751	21,815	18,855
Zinc Oxide ..... tons	845	1,044	28,711	34,241
All other Sorts ...value	—	—	238,277	238,121
DYES AND DYESTUFFS—				
Intermediate Coal Tar Products.....cwt.	112	151	1,220	1,547
Alizarine ..... ,,	844	178	12,458	2,987
Indigo, Synthetic . ,,	—	—	—	—
Indigo, Natural ... ,,	24	4	775	100
Other Sorts ..... ,,	2,569	2,443	71,858	54,101
Cutch ..... ,,	5,356	7,074	7,094	11,144
All other Extracts for Dyeing..... ,,	7,265	6,007	26,541	14,563
Extracts for Tanning (solid or liquid).. ,,	158,064	98,082	146,391	94,655
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground ...cwt.	61,725	71,641	16,293	17,722
White Lead (dry) .. ,,	14,388	15,527	27,206	30,003
All other Sorts..... ,,	87,136	177,384	104,072	152,529
Total of Chemicals, Drugs, Dyes and Colours .....value	—	—	1,146,410	1,073,018

Exports

	Quantities. Month ending July 31.		Value. Month ending July 31.	
	1924.	1925.	1924.	1925.
			£	£
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	2,886	1,116	3,653	1,476
Acid Tartaric ..... ,,	1,157	1,052	6,707	5,913
AMMONIUM—				
Chloride (Muriate) .tons	299	197	9,802	6,508
Sulphate—				
To France..... ,,	739	—	8,912	—
Spain and Canaries.... ,,	12,087	12,951	158,549	150,538
Italy..... ,,	135	20	1,849	246
Dutch East Indies,,	550	322	7,814	4,124
Japan..... ,,	400	861	5,403	11,229
British West India Islands (including Bahamas) & British Guiana ..tons	418	680	5,558	8,562
Other Countries ,,	5,718	7,189	71,720	86,426
Total ..... ,,	20,047	22,023	259,805	261,125
BLEACHING POWDER .cwt.	17,757	19,538	9,588	10,045
COAL TAR PRODUCTS—				
Anthracene.....cwt.	—	—	—	—
Benzol and Toluol .galls.	266,626	1,116	22,758	140
Carbolic Acid ..... cwt.	16,137	17,353	33,193	24,941
Naphtha.....galls.	4,699	5,159	420	491
Naphthalene .....cwt.	1,400	554	1,042	521
Tar Oil, Creosote Oil, etc. .....galls.	5,255,444	7,010,827	192,430	219,943
Other Sorts ..... cwt.	45,112	30,521	24,462	21,869
Total.....value	—	—	274,305	267,905
COPPER, Sulphate of .tons	1,138	1,699	27,240	37,644
DISINFECTANTS, etc. .cwt.	30,368	33,457	79,737	84,977
GLYCERINE—				
Crude ..... cwt.	211	5,986	547	15,719
Distilled..... ,,	15,730	9,197	62,111	35,253
Total ..... ,,	15,941	15,183	62,658	50,972
POTASSIUM—				
Chromate and Bichromate ..... ,,	2,517	1,990	6,341	3,975
Nitrate (Saltpetre) ,,	1,679	1,335	3,395	2,652
All other Sorts .... ,,	1,447	1,095	15,866	13,046
Total ..... ,,	5,643	4,420	25,602	19,673
SODIUM Carbonate .. ,,	540,015	404,900	134,532	119,174
Sodium Caustic ..... ,,	162,736	135,940	137,069	106,974
Sodium Chromate and Bichromate .... ,,	7,688	2,018	14,666	3,427
Sodium Sulphate, including Salt Cake ,,	93,238	87,029	16,450	14,195
All other Sorts ... ,,	77,890	49,903	126,163	83,078
Total ..... ,,	881,567	679,790	428,880	326,848
ZINC OXIDE ..... tons	238	645	9,022	23,289
Chemical Manufactures, etc., all other Sorts. value	—	—	320,107	304,634
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) .... value	—	—	1,517,106	1,401,009
DYES AND DYESTUFFS—				
Products of Coal Tar. cwt.	9,516	6,237	75,150	47,417
Other Sorts ..... ,,	6,581	3,767	8,235	4,848
Total ..... ,,	16,097	10,004	83,385	52,265
PAINTERS' COLOURS AND MATERIALS—				
Barytes, Ground .. cwt.	3,160	13,300	1,520	5,691
White Lead (dry) . ,,	19,401	12,363	46,182	29,196
Paints and Colours, ground in Oil or Water ..... ,,	31,743	35,115	73,471	85,524
Paints and Enamels Prepared (including Ready Mixed) .. ,,	37,254	30,576	120,218	102,851
All other Sorts .... ,,	49,480	54,872	98,747	106,818
Total ..... ,,	141,038	146,226	340,138	330,080
Total of Chemicals, Drugs, Dyes and Colours.....value	—	—	2,207,457	2,034,635

German Dye Cartel Reports

Figures for 1924

THE current issue of *Drug and Chemical Markets* contains a summary of the annual reports of the German Dyestuff Cartel for 1924, compiled and just issued by the chemical division of the Department of Commerce, U.S.A., through its trade commissioner in Berlin. This shows an improved condition as compared with 1923, and practically all the Cartel members paid 8 per cent. in 1924.

Badische Anilin und Sodafabrik

The gross profits of the Badische Anilin und Sodafabrik are given at 39,080,000 marks (as against 32,400,000 marks in 1913) from which are deducted 8,590,000 marks for general expenditures and 15,610,000 marks deducted, leaving net profits of 14,880,000 marks (1913, 17,170,000 marks). It is stated that before the gross profits were ascertained, 3,000,000 marks were set aside for the "Jubilee Fund" in connection with the 60th anniversary of the company. Out of the net profits, a dividend of 8 per cent. on the common and 3½ per cent. on the preferred stock is to be declared. In 1913, the dividend on the common shares was 12 per cent., and in 1914, 19 per cent. No dividend was paid in 1923. Common stock issued in 1913 was of 36,000,000 marks par value as compared with 176,000,000 marks at the present time. The preferred shares, which have been revalued at 1,200,000 marks par value, were issued after the war. The balance sheet shows nothing of the amount received for damages from the German Government because of the Ruhr occupation.

The report states that it was necessary to conduct business with the greatest caution in 1924, because of the scarcity of capital; that sales of synthetic nitrogen were satisfactory; that sales of fertilisers showed such a heavy increase that a considerably heavier yield of agricultural products in Germany might be expected as compared with previous years; that the manufacture of methanol and butyl alcohol by the new synthetic process had been put on a commercial basis; and that while competition in dyestuffs with foreign countries had increased, results were not unfavourable. It is to be noted that the balance sheet shows debts due the company of 88,940,000 marks, forming nearly 25 per cent. of its assets, while the company owed 97,260,000 marks, 37 per cent. of all liabilities including stock issued. Stocks on hand represented 20 per cent. of the total assets, the same as in 1913. The report sufficiently illustrates the credit situation in Germany, but does not give much information of value to stockholders.

The Agfa and Hoechster Farbwerke Meetings

At the general annual meeting of Aktien Gesellschaft fuer Anilin Fabrikation, Berlin-Treptow, net profits of 5,072 billion marks were reported. The *Agfa* reports that the future outlook of the German Dye Trust is not encouraging, particularly on account of foreign competition in dyes, which was stimulated during and after the war. Assurance was given to stockholders that, other things being equal, dividends—that for 1924 being 8 per cent.—will be sustained in future. Despite a considerable loss of dyestuffs markets, the I. G. is shifting production progressively to other compensating staples, viz.: air-fixed nitrogen, methanol, pharmaceuticals, etc. The *Agfa* reports good business in some branches, but in others the index of activity is no more than 50 per cent.

The annual meeting of stockholders of Hoechster Farbwerke vorm. Meister Lucius and Bruening, Hoechst/Main, discloses little of public interest. The balance sheets were approved, and an 8 per cent. dividend announced for 1924. The Hoechster works announce a clear profit of 14,709 million gold marks. Dr. Haeuser, in reply to a report as to whether the I. G. had entered into any fusions or mergers with foreign interests, said that this had not been the case. In this connection, whatever American connections have been developed have been entered into by individual I. G. members, and not by the I. G. as a unit. Stockholders of Chemische Fabrik Kalle and Co., Biebrich, Rhein, a subsidiary plant of the Hoechster, also approved the company's balance, and a dividend of 8 per cent., which is universally declared by members of the Dye Cartel.

At the annual meeting of its stockholders, Farbenfabriken vorm. Fried. Bayer, Leverkusen am Rhein, proposed an 8 per cent. dividend on 1924 business. Gross earnings were 33,301,694 marks, from which general costs, amounting to 8,219,016 marks, were deducted, and a further 10,190,071 marks was written off. Net earnings then amounted to 14,982,607 marks. The pensions and bonus account was increased from three to thirteen million marks. The Bayer Co., like all large industrial enterprises, was adversely affected by capital shortage. High rates of interest, taxation, reparations deliveries, duties, and export taxes are mentioned as notable handicaps to business. Other factors are: export sales of dyes are declining against growing foreign competition, stocks had to be accumulated, production to be reduced, and labourers to be discharged.

Griesheim-Elektron's Report

Griesheim-Elektron, Frankfort/Main, publishes its annual report, proposing a dividend of 8 per cent. on 1924 business. Griesheim-Elektron complains of adverse conditions, especially at the beginning of 1924, when the sales crisis was at its peak. In order to meet foreign competition, by reducing production costs, technical apparatus was partly re-ordered and standardised, while part of this plant's production was removed to the Bitterfeld area, in Central Germany, where cheap lignite is available for power. This re-ordering and standardisation of production, together with a bettering of conditions in the second part of 1924, did not, however, result in a satisfactory total of the year's business.

Out of gross earnings of 16.27 million marks there remained a net earning of 3.92 million marks. Dividends on common stock required 3.52 millions, the 3½ per cent. preference shares called for 11,200 marks; 32,000 marks were assigned to the reserve fund, etc. The outlook for 1925 is considered uncertain, as much depends upon the conclusion of Germany's commercial treaties. Until the present, however, the Griesheim plants are working at a satisfactory rate, and in some cases production has been increased.

Artificial Silk Duties

Regulations for Traders

IN a statement just issued by the Manchester Chamber of Commerce with a view to assisting manufacturers and merchants in the matter of the artificial silk duties, points are made as a result of co-operation with the Customs officials. Regarding the importation of artificial silk, either as yarn or as a component part of cotton and woollen goods, the Chamber points out that for duty purposes the Customs require the actual net weight of the silk or silk contents of mixed goods to be furnished to them, and that duty is payable upon such net weight. The precise character of the silk or artificial silk must also be indicated. Noil silk may be used in a mixture, but for duty purposes this is classified at a much lower rate. The authorities have to test these goods and check specifications, but it has been arranged that this shall be done without the goods being delayed at the port of entry. An expedient for assisting traders is that a bond may be entered into by the importer. This does not necessitate any cash transaction, but upon its being entered into the goods will be released immediately after a sample has been taken for testing purposes, and it is suggested that the Chamber of Commerce Testing House certificate should be accepted in the final arbitrament.

As to the exportation of artificial silk, the position is, at present, complicated by the existence of large stocks of artificial silk upon which neither Customs nor Excise duty has been paid. The authorities are endeavouring to fix on a date prior to which no rebate will be granted unless proof of duty having been paid is forthcoming. After this date it will be assumed that all artificial silk will have paid duty and be entitled to rebate. It is explained that goods for the Irish Free State are treated as exported to a foreign country, and rebate can be claimed providing that the silk content has been subject to a duty by the Customs or Excise.

Protecting the Inventor

A NEAT little folder entitled "Many Inventions—Typical and Topical," issued by Kings Patent Agency, Ltd., of 146A, Queen Victoria Street, London, E.C.4 ('phone Central 682), reminds us of the important work of the patent agent in assisting the inventor to protect his ideas and of the advantage of securing provisional protection. A free patent handbook may be obtained by applicants.

Tetraethyl Lead Poison Hazards

By Thomas Midgley

In the following paper, presented before the Division of Industrial and Engineering Chemistry of the American Chemical Society, Mr. Midgley, of the Ethyl Gasoline Corporation, of New York, reviews the poison hazards in the manufacture and use of tetraethyl lead, and shows them in many respects to be considerably exaggerated as the result of a few poisoning cases.

RECENTLY in a semi-works production plant manufacturing tetraethyl lead by a newly developed process there occurred an accidental poisoning which cost the lives of five men. The publicity resulting from this accident gave rise to a variety of opinions and opened an attack upon the general proposition of using tetraethyl lead in gasoline. Although these opinions were in almost every case the result of assumptions as to the facts, rather than knowledge, it is believed that the best interest of the public will be served by a clear statement as to the actual hazards involved in carrying out the ethyl gasoline programme.

It is not the purpose of this paper to enlarge upon the benefits of the use of tetraethyl lead in gasoline. It may not be amiss, however, to mention broadly the advantages to the public which will follow upon its general use. These are (1) conservation of petroleum due to the increased mileage obtainable by using a non-knocking gasoline in a high-compression motor, (2) reduction of carbon monoxide contamination of the atmosphere due to increased efficiency of combustion, and (3) reduced first cost of automotive apparatus. So far as science knows at the present time, tetraethyl lead is the only material available which can bring about these results, and the results are of such vital importance to the continued economical use of all automotive equipment that, unless a grave and unescapable hazard exists in the manufacture of tetraethyl lead, its abandonment cannot be justified.

The actual hazard involved in the general programme of treating gasoline with tetraethyl lead has been found to exist only in the manufacture and handling of the concentrated material. However, for the purpose of a complete discussion it is well to mention all the points where the most careful study of the matter indicates any possibility of hazards, and discuss each one upon its merits and the data available. These points are (1) the manufacture, (2) the handling and mixing with gasoline, (3) the handling of the treated gasoline, (4) proper use of the treated gasoline in internal combustion engines, and (5) the improper uses of such gasoline.

Manufacture

Admittedly, a hazard exists in the manufacture of tetraethyl lead, but compared with other chemical industries it is neither grave nor unescapable. This hazard has been recognised and has been guarded against always to the full extent of the knowledge then available, but, like any other commercially new chemical product, tetraethyl lead has peculiarities which are only fully understood after practical experience, and which could not possibly be predetermined from laboratory work.

The greatest danger both in the manufacture and handling of the concentrated tetraethyl lead lies in the fact that it is a slow poison rather than an active one. It is well to distinguish between these two properties. Tetraethyl lead is only one-twentieth as poisonous as bichloride of mercury, and for that matter is much less poisonous than many other commodities in everyday use, but unfortunately it gives no warning to the subject until he approaches a condition of serious poisoning. For this reason, workmen become careless in handling tetraethyl lead and, even when most carefully watched, they may in time contract poisoning if there is any possible chance of exposure to it. This has been the history of practically every individual who has suffered from tetraethyl lead.

As the result of experience, which, however costly, seems nevertheless to have been the only possible teacher, tetraethyl lead poisoning can now be detected by a well-informed physician before the slightest danger develops. In this connection it will be well to mention the difference between tetraethyl lead poisoning and the ordinary type of lead poisoning familiar in the lead industry. Ordinary or chronic lead poisoning is denoted by the following symptoms : stippling of the blood cells, lead line at the base of the teeth, stomach cramp (commonly called painter's colic), paralysis (most commonly wrist drop), and in extreme cases spasms and death. None of these symptoms is observed in poisoning due wholly to tetraethyl lead, in which case the symptoms are, in the order of their appearance, drop of blood pressure, drop of body temperature, reduced pulse, sleeplessness, loss of weight, sometimes nausea, sometimes tremor, and, in the most serious cases, delirium tremens. The first three do not indicate any danger to the patient, who, if removed from proximity to tetraethyl lead, readily recovers his original health within a short time. With the development of sleeplessness, however, the experienced physicians regard a man as being in some danger, and direct not only that he be carefully kept from any possible further contact with tetraethyl lead but, above all, that he be kept outdoors as much as possible, taking moderate exercise. It is inadvisable to put the patient to bed, since this appears only to add to his nervous condition, and the administering of sleep-inducing drugs which would ordinarily be employed under such conditions has been found to be decidedly harmful.

In the commercial manufacture of tetraethyl lead it is necessary to supervise the men closely in order that they may not grow careless. Proper means for preventing tetraethyl lead from coming in contact with any workmen—proper chemical apparatus, suitable types of clothing, and adequate ventilation—must be provided, for it must be borne in mind that tetraethyl lead may enter the body through the skin or by inhalation as well as through the mouth.

Handling and Mixing with Gasoline

In handling tetraethyl lead at the points where it is mixed with the other constituents of the concentrated ethyl fluid and where the ethyl fluid is added to the gasoline, adequate clothing protection must be used, and the safety rules, although simple, must be rigidly enforced. Apparatus designed to prevent the men from coming into contact with tetraethyl lead must be used.

Handling of Treated Gasoline

After mixing tetraethyl lead with gasoline, no great precaution need be exercised, the ratio being 1 part tetraethyl lead to 1,300 of gasoline. From this point on no health hazards actually exist unless the gasoline is used very abnormally for purposes for which it was not intended. Animals have been subjected to gasoline treated with tetraethyl lead, and such lead as was absorbed along with the gasoline has been shown to be eliminated. These experiments have been carried on under conditions that could not be duplicated by a human being.

Use of Treated Gasoline in Engines

After this treated gasoline has been introduced in the tank of an automobile there are no health hazards, although many imaginary ones have been suggested. The fumes arising from the gasoline itself have been suggested as a source of possible danger. These have been studied carefully, but it has so far been impossible to cause any damage to the health of animals by excessive treatment with such fumes.* In fact, it has been impossible to detect any difference in this regard between the treated gasoline and ordinary gasoline, whereas benzol, used instead of gasoline under the same conditions, produces death in a very short time.

It has been suggested that the amount of tetraethyl lead vapour emitted by a gasoline motor which is being cranked but which is not firing constitutes a health hazard. Since the amount of gasoline vapour contained in such a mixture is so great as to be irrespirable, the experiments were conducted on tetraethyl lead vapour at the concentration occurring in such an exhaust. With such a concentration toxic effects could be noticed upon animals in 24 hours, but by diluting this concentration to one-half it was possible to keep animals for upwards of six weeks without developing toxic effects. When it is remembered that the exhaust from any motor must be diluted many hundred times before it can be breathed, it becomes apparent that this " bug-a-boo " is laid to rest.

* Since this article was written certain experiments have indicated that prolonged and excessive inhalation of the vapour from ethyl gasoline or extreme and continued skin contact with ethyl gasoline may result in storage of lead in animals experimented on.

The exhaust from an operating motor has received an enormous amount of attention both in the writer's laboratory and by the United States Bureau of Mines, and it has been impossible to develop data to substantiate any claim whatsoever that any danger to the general health of the public at large exists in this exhaust. It may be well to review briefly the work carried on by the Bureau of Mines covering this point.

The experimental station at Pittsburgh, Pa., is equipped with a room originally designed for studying carbon monoxide concentration from automobile exhausts. This room had to be changed slightly in order to obtain any lead from the exhaust of a motor using the treated gasoline, and was so arranged that the maximum amount of lead dust coming from the motor in an absorbable form was dispersed throughout the chamber. The exhaust from a motor burning the treated gasoline was introduced into the room and diluted with just enough air to correspond with an atmosphere in which there would be the permissible amount of carbon monoxide for one-hour exposure without dangerous effects to life from carbon monoxide. The carburettor of the motor was carefully adjusted so as to reduce the carbon monoxide content to a minimum, but leaving the lead-dust content unchanged. Two sets of animals were then introduced into the chamber—one set for six hours and the other set for three hours per day. A control set of animals was also kept in the animal house, but never allowed to come into contact with lead in any way. All sets of animals included pigeons, monkeys, dogs, guinea pigs, and rabbits. The animals were carefully noted at different periods through the test, which lasted eight months, for any symptoms of lead poisoning. Not a single symptom developed, and at the expiration of the test several specimens both of the exposed animals and of the control animals were purposely killed. The bodies were analysed for lead, and although lead was found in all cases it was a very minute quantity, and was the same in the control animals as in the exposed animals.

Improper Uses of Ethyl Gasoline

Ethyl gasoline is sold to be used only as a motor fuel, and the public is specifically warned of the dangers in using it otherwise, such as for washing motor parts, washing human body parts, cooking purposes, etc. This gasoline has been coloured with an aniline dye to distinguish it from any other material sold to the public. Nevertheless, exhaustive tests have been carried on both by the writer's laboratories and by the Bureau of Mines to determine what hazards may exist in the improper use of this material. It will be recognised that there is perhaps no limit to the improper uses to which gasoline may be put, and that such an investigation can never be considered as entirely completed. With a single exception, however, no health hazard has yet been discovered in the improper use of this gasoline. The one exception is the use of the gasoline in an open flame for toasting bread, in which case it has been determined that after several days of such a diet a touch of painter's colic may result. Tests have also been run to determine the settling of lead dust in a garage, without disclosing any menace therefrom.

No one is more anxious to discover if any health hazard exists in the use of tetraethyl lead than the people who are interested in extending its use. They have endeavoured in every way possible to anticipate future conditions, and even intensify those conditions, without, however, having been able to verify any of the statements upon which many criticisms have been based.

German Heavy Iron Trade

THE position of the heavy iron industry in Germany is reported to have become still worse, both home and foreign orders being very difficult to obtain and prices going steadily down. The market for rolling-mill products was also very quiet, the fight for orders forcing prices down. The crisis in the Dusseldorf machinery industry is slowly growing. The number of orders received has been decreasing, as has the number of orders in hand. As regards locomotive building, business was quite dead. There was no great change in the chemical industry, though complaints were made regarding increasing foreign competition. The electro-technic industry reports a decrease of orders, especially foreign, attributed to the decrease in the competing power of German firms.

German Developments in Oil Fuel

Statement by the Badische Co.

THE Badische Anilin and Soda Fabrik has issued from Ludwigshaven an explanatory statement respecting certain new processes which have attracted considerable public attention. The public, it is pointed out, may be led to infer that the processes referred to are all related. Most of the reports published refer to synthetic methyl alcohol, which has been on the market for some time, and which is manufactured from powdered coal and hydrogen under high pressure. This process, which has created much interest abroad, is protected by the American patent of the Badische Co. of 1913, and now belongs to the Chemical Foundation, to which German patents taken out in America were sold by the Public Trustee during the war. Methyl alcohol, as is already known, can be used as a motor fuel, but its general application is stated to be impracticable on account of its cost. In view of the fact that the low cost of "methanol" in America is threatening the existence of the wood alcohol industry there, it is a little difficult to understand precisely what the above statement means. Research is being continued and, the statement says, there are grounds for anticipating that a serviceable fuel will soon be available. Up to the present no definite result has been reached to justify the hope of furnishing Germany with a new native source of fuel supply. An alleviation of the whole coal and power problem by utilising some such process is not possible in the immediate future, and people are warned against premature hopes. The Badische Co. participated in the purchase of the Stinnes interest in the Riebeck-Montan-Werke and of the shares of the Evag Company because the dye syndicate had to extend its basis for supplies of lignite for the ammonia works and required a free hand for future developments.

A further invention of the Badische Co. is a new product which can be added in small quantities to benzol for the purpose of preventing "knocking" in internal combustion engines. It is designed to serve as a substitute for the substance used in America for this purpose, but to which objection has been taken on account of its poisonous nature. Extensive trials are being carried out in Germany at present to establish its suitability and durability in practice. Its use would bring about a high compression in motors and permit a better utilisation and economy of the fuel.

The Badische statement also refers to certain remarks of Dr. Duisberg with reference to the pharmaceutical department. Dr. Duisberg spoke of the achievement and great progress made by the invention of Bayer 205 in the fight against sleeping sickness and against the tsetse fly. The company, he stated, is developing its research and recent results justify the belief that in fighting tropical diseases successes are well within view which will mark a considerable step forward.

American Capital for Silk Works

THE British Artificial Silk Co., of Sidcup, Kent, which was recently formed to manufacture viscose artificial silk at the old works of the Kent Silk Mills, and which failed to raise the capital it required in this country, is now (the *Manchester Guardian Commercial* states) trying to raise working capital in the U.S.A. The company's proposed capital is divided into 195,000 8 per cent. cumulative preference shares of £1 and 100,000 ordinary shares of 1s. each, and they offer $650,000 worth of shares for subscription in the U.S.A. Mr. George Ferdinando, the chairman and managing director of the company, is reported to have offered American subscribers two seats on the board in place of two of the British directors.

Healthiness of Chemical Workers

THERE is an impression current that work in chemical factories is very injurious to health, and that the fumes of chlorine or the fine dusty particles of powder, such as "bleach," have a bad effect on the human respiratory apparatus. Experience at the works of a well-known and old-established alkali company is very far from supporting this belief. A non-contributory insurance scheme is in operation, and the workers attain a ripe old age before they are pensioned off, while the amount of time lost through sickness and accident is by no means excessive.

From Week to Week

A PROCESS FOR HARDENING AND TEMPERING LEAD is announced by the Western Electric Company's engineers, Messrs. R. S. Dean and W. E. Hudson.

PROFESSOR MOUREU, of the Collège de France, is the head of a new French committee appointed to maintain the chemical industries of the country at a point necessary for national defence.

MR. P. WHITE, B.A., of Clare College, Cambridge, has been elected to the Denman Baynes Research Studentship, value, £100 per annum. The studentship is for research in chemistry, physics or mathematics.

A CHEMICAL INDUSTRY DINNER, at which 1,200 are expected is being arranged to be held in New York during the week of the Chemical Exposition, September 28 to October 3. Dr. Charles H. Herty is the prime mover.

GERMAN DYE FORMULÆ were stolen by an employee working in the research laboratories of Chas. Beyer and Co., a large chemical firm near Cologne. The papers related to a new range of dyes about to be patented and the thief disposed of them to a French agent, but was arrested.

CONTROL FOR PLATINUM was advocated by Dr. Percy Wagner, senior geologist of the Union of South Africa Geological Survey, in a recent address at the Rotary Club, Johannesburg. He declared that he was an optimist as regards the platinum industry, but production would have to be controlled.

ELECTRICITY IN MINES has been more extensively used, according to the report of H.M. Electrical Inspector of Mines for the year 1924. The report also gives the number of coal-cutting machines in use during the last ten years, and particulars of electrical equipment and of fatal accidents due to the use of electricity.

THE BOARD OF TRADE announce that they have appointed Mr. J. F. Ronca (now on the staff of the Industries and Manufactures Department) to be Director of Gas Administration as from September 1 next, in succession to Mr. H. C. Honey, who is retiring from that post after 42 years' service in the Board of Trade.

THE BRITISH CAST IRON RESEARCH ASSOCIATION will hold its second conference at Balliol College, Oxford, September 25 to 28, 1925, further information with regard to which can be obtained from the secretary, Mr. G. W. Keeling, at 38, Bloomsbury Square, London, from whom also a copy of the proceedings of the first conference can be obtained.

NATIONAL AND LOCAL ECONOMY is the subject of an appeal addressed by Mr. Stanley Machin, president of the Association of British Chambers of Commerce, to the various chambers. It is urged that local economy can really be effectively dealt with, and if the trade and commerce of districts is to be maintained there must be very large reductions in the expenditure of all local authorities.

A VALUABLE ORDER for metering equipment for the Shropshire, Worcestershire and Staffordshire Power Co.'s new super station at Stourport has been received by Industrial Combustion Engineers, Ltd., from Babcock and Wilcox, Ltd. The order is for four Bailey boiler meters to record, indicate, and integrate steam flow, record air flow, and flue gas temperature on one and the same chart; one steam flow meter and four 5-element multipointer gauges.

THE LEIPZIG TECHNICAL FAIR, which is the latest section of the old Leipzig General Sample Fair, will be held from August 29 to September 9. The Fair came into existence in 1268 and takes place twice yearly. Over 200,000 visitors were present at the last exhibition held in March, and almost every nationality in the world was represented, including over 1,200 merchants from this country. For the forthcoming Fair some 15,000 exhibitors have booked stands, and a great wealth and variety of exhibits is promised.

MR. J. MACKIE, of the Incorporated Association of London Dyers and Cleaners, addressing the Drapers' Summer School at Oxford on Monday, said that the manufacture of artificial dyes had increased at an unparalleled rate because they were simpler and more certain in their application than natural dyes. There was no industry which would depend so much on technical skill as the dyeing industry, and as the future of other trades depended upon it, training schools should be used to the fullest advantage.

AFTER FIFTY YEARS at 1, Fenchurch Avenue, London, E.C.3, F. W. Berk and Co., Ltd., are removing their head offices on Monday, August 24, to larger premises at 106, Fenchurch Street, London, E.C.3. The telephone numbers and telegraphic address will not be changed. Founded more than half a century ago by the late chairman of the company, Mr. F. W. Berk, the firm is to-day among the best known in the British chemical industry, its position with regard to the manufacture of acids being especially strong. In addition, other products and a world-wide merchanting and export business have been developed. The new offices occupy a large area of the ground and lower ground floors at 106, Fenchurch Street, and have been spaciously planned on somewhat unique lines that should do much to facilitate the conduct of business, whilst the new building itself, one of the merchant palaces recently raised above the old City streets, is in every way worthy of the traditions of the firm.

A CONFERENCE of the Society of Leather Trades' Chemists will be held in Paris from September 20 to 25.

A NEW CEMENT FACTORY, with an annual output of not less than 110,000 tons of Portland cement, is to be erected at Dunstable.

THAT THE GLASS INDUSTRY has not made out a prima facie case for inclusion in the Safeguarding of Industry Act has been intimated by the Board of Trade.

FOLLOWING THE APPOINTMENT of Dr. O. F. Hudson as Superintendent of Research, a small central laboratory has been started at the University of Birmingham.

A SHIPMENT OF LIQUORICE ROOT is reported to have been received at Philadelphia direct from Leningrad by a Danish steamer. This is stated to be the first cargo of liquorice ever shipped from the old port of St. Petersburg, all previous shipments having been made from Black Sea ports.

THE IRON AND STEEL INSTITUTE is holding its annual meeting on September 9 to 11 at Birmingham University. Among the subjects to be discussed are iron and steel equilibrium systems, iron crystals, moulding sands, and various aspects of furnace practice. Sir Frederick Mills will preside.

SIR CHARLES S. SHERRINGTON, President of the Royal Society and Waynflete Professor of Physiology in the University of Oxford, has been appointed a member of the Medical Research Council as from September 30 next, in succession to Dr. Henry Head, F.R.S., who is retiring from the Council.

WE HAVE RECEIVED from the Smithsonian Institution, Washington, a number of interesting pamphlets which include an article on the late Sir James Dewar by Sir James Crichton-Browne, and a report on "Atmospheric Nitrogen Fixation" by Mr. Eric A. Lof, of the American Cyanamid Co.

LORD ONSLOW, Under-Secretary to the War Office, gave a demonstration at Guildford on Tuesday of steel houses that he had had built. He stated that the housing problem would not be solved in any appreciable space of time unless a considerable increase could be obtained in the annual output of houses.

A DURHAM IRON AMALGAMATION has been completed by the fusion of the Grange Iron Co., Ltd., colliery and general engineers, of Belmont, Durham, with Joseph Cook, Sons and Co., Ltd., of the Washington Steel and Ironworks, so that at the end of September the long-established Grange Company will cease to exist.

DR. ELLWOOD HENDRICK, curator of the Museum of Columbia University, left England on Friday, on his return to New York, after a stay of over two months, during which he has visited the Continent as well as Scotland and Ireland, and increased his already large circle of friends in the chemical profession and industry.

OWING TO THE SILK DUTIES nearly a score of Dutch, Italian, French, Spanish, and German firms are understood to be looking for sites in this country with a view to building artificial silk factories. The reason for this move is their alarm at the possibility of losing valuable English markets owing to the new duties.

THE PRODUCTION OF MINERALS in South Africa in June has just been announced by the Government of the Union of South Africa. Output of gold, 778,964 ounces, value £3,308,828; production of silver, 109,667 ounces, value £15,537; coal, 1,350,703 tons mined, 1,090,967 tons sold, value £327,595; copper, 952 tons, 98 per cent. pure metal, and tin, 166 tons, 66 per cent. pure metal.

DR. LUCIEN C. WARNER, whose death is announced in New York, was the chairman and founder of the Warner Chemical Co., a well-known New York firm, which developed a number of chemical products not previously manufactured in America. He was associated with several banking and other organisations, and he was well known as a lecturer on health.

THE EMPIRE STEEL CORPORATION'S directors have arrived at St. John's, N.F., from Montreal to discuss with the Government the abolition of the present contract levying an export duty on iron ore exported from the company's mines and the substitution of a new agreement. The Government is willing to supersede the present contract with a freight tax per ton, but the company asks for freedom from taxation for fifty years.

THE NEW CHEMICAL LABORATORY of the Department of Scientific and Industrial Research at Teddington, Middlesex, is now nearing completion. It is announced that one research chemist, one research engineer and a few junior research chemists are required and that application should be made on a form to be obtained from the Department, and must be returned to the Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, Westminster, S.W.1, not later than September 4.

GAS AND FUEL PLANTS, LTD., London, announce that, following the successful working of the initial complete gasification of coal plants installed by their French agents, Société Anonyme des Appareils de Manutention et Fours Stein, the following continental gas companies have placed repeat orders for their plants: Cie Nlle. d'Eclairage, chauffage et force motrice de St. Germain-en-Laye et Extensions, and Cie Continentale du gaz (second repeat). Further orders in hand include the installation of a plant to produce 300,000 c. ft. of gas daily for the works of Automobiles Berliet. The gas will be used for firing various types of furnaces.

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Patent Literature

Abstracts of Complete Specifications

236,984.—Decolorising Carbon, Apparatus for Making. J. N. A. Sauer, Den Texstraat 2, Amsterdam, Holland. Application date, April 5, 1924.

Specifications Nos. 206,862 and 228,582 (see The Chemical Age, Vol. X, p. 73 and Vol. XII, p. 255) describe a process and apparatus for making decolorising carbon from a granular carbonaceous material by the action of heat and activating gas in a retort. The retort may be heated externally or internally, and when internal heating is used, part of the charge or a combustible gas may be burned in the retort. The granular material is maintained in a state of agitation and flotation during activation by a blast of gas. It is now found that decolorising carbon can be made by this method as efficiently in a very small retort as in the large retorts used in other methods. It is possible to use a retort about four feet in height, and such retort may be mounted on wheels so that the decolorising carbon may be made at the place where it is to be used. The same carriage may be provided with a generator for producing the activating gas from crude oil or petrol, and also with an apparatus for pre-distilling or carbonising the raw material. The retort may be a steel casing lined with fire brick or magnesia, and the lining is protected when not in use by an inner metal tube. The tube may be of " nichrome " and may be left in the retort, or the retort may be made of this alloy with an outer jacket of asbestos.

237,030. Oxides of Carbon, Process for Transforming into Oxygenated Compounds. J. Y. Johnson, London. From Badische Anilin und Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, April 28, 1924.

Specification No. 229,715 (see The Chemical Age, Vol. XII, p. 337) describes a process for converting oxides of carbon into methanol with the aid of catalysts containing combinations of hydrogenating elements and elements from the fourth to the seventh group of the periodic system. The oxides mixed with hydrogen are passed at a high temperature and pressure over catalysts containing two or more metals, the oxides of which are reduced by the action of reducing gases such as hydrogen or carbon monoxide at ordinary pressure, at or below 550° C. to substantial amounts of the metal. Iron, nickel, and cobalt are excluded. Oxides of copper, silver, lead, and cadmium are suitable, and also such metal oxides which can be reduced under these conditions in the mixture, *e.g.*, zinc oxide is readily reduced in the presence of copper. The catalyst may contain a small proportion of calcium carbonate, and the process may be effected at 200°–350° C. at pressures preferably above 200 atmospheres. The hydrogen should be present in theoretical amount, or in excess. In an example, a solution containing copper nitrate and zinc nitrate in molecular proportions of 10 : 1 is precipitated by potassium carbonate solution, and the carbonates are washed and dried. The powder is made into a paste with 5 per cent. of sugar and 30 per cent. of formaldehyde solution. The paste is dried and reduced with dry hydrogen at 250°–300° C. and this contact mass is used for treating a mixture of carbon monoxide 1 part and hydrogen 9 parts by volume at a temperature of 300° C. and pressure of 150 atmospheres. The gases are cooled under pressure yielding liquid methanol. Reference is directed in pursuance of Section 7, Sub-section 4 of the Patents and Designs Acts of 1907 and 1919 to Specification No. 20,488/1913.

237,096. Dyestuffs of the Triaryl-Methane Series, Manufacture of. R. B. Ransford, London. From Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. Application date, July 18, 1924.

These dyestuffs are obtained by condensing a triphenyl-methane dye derived from a benzaldehyde having a replaceable parasubstituent, *e.g.*, Cl, NO_2, SO_3H, CH_3O, etc., and two molecular proportions of an *o*-oxybenzene carboxylic acid with a halogenated aromatic base containing a substituent in ortho position to the amino group. Suitable examples of the latter are 4-chloro-2-toluidine, 5-chloro-2-toluidine, 6-chloro-2-toluidine, 4 : 6-chloro-2-toluidine, 3-chloro-4-toluidine, 4-chloro-2-anisidine, 4-chloro-anthranilic acid ester, 1-chloro-2-aminonaphthalene, etc. These dyes give bluish-red to reddish-violet shades on wool, becoming red-violet on chroming. Treatment with sulphonating agents increases the solubility. In an example, orthocresotinic acid is condensed with parachlorbenzaldehyde, and the dye obtained is slowly heated with 6-chloro-2-toluidine and its hydrochloride. The mixture is poured into water, made alkaline, excess of the base distilled off, and the residue acidified with hydrochloric acid, filtered, and washed. Other starting materials may be employed, such as the dye obtained by condensing salicylic acid and parachlorbenzaldehyde, and other aromatic amines such as the dihalogenated orthotoluidines, *e.g.*, 4 : 6-dichloro-orthotoluidine.

237,100. Purified 1-Nitro 2-Methylanthraquinone, Manufacture of. H. E. Fierz, 2, Böndlerstrasse, Kilchberg, near Zurich. Switzerland. Application date, July 28, 1924.

The isomerides contained in crude nitromethyl-anthraquinone can be removed by heating the aqueous suspension with a salt of sulphurous acid in a reflux apparatus or autoclave. The isomerides are converted into sulphonic acids, and the 1-nitro-2-methyl-anthraquinone remains unaltered. This may be treated with sodium sulphide to obtain pure 1-amino-2-methyl-anthraquinone, from which the bromine and other derivatives can be obtained.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—214,652 (E. Slatineanu) relating to a process and apparatus for carrying out chemical reactions, see Vol. X, p. 681 ; 218,247 (Naugatuck Chemical Co.) relating to a process for treating rubber, see Vol. XI, p. 223 ; 216,140 (Gelsenkirchener Bergwerks Akt.-Ges. and H. Hock) relating to production of light oils and gases from distillation products, see Vol. XI, p. 102 ; 227,090 (Soc. Chimique des Usines du Rhône) relating to manufacture of arsenates of the alkaline earth metals, see Vol. XII, p. 233 ; 228,143 (Soc. Anon. Nieuport-Astra) relating to light alloys, see Vol. XII, p. 31 (Metallurgical Section) ; 230,045 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab) relating to separation of potassium compounds from aluminium compounds, see Vol. XII, p. 484 ; 232,185 (Compagnie de Produits Chimiques et Electrometallurgiques) relating to preparation of a nitrogen-hydrogen mixture for ammonia synthesis, see Vol. XII, p. 616 ; 233,318 (A. Peetz) relating to manufacture of cellulose by boiling wood, etc., with bisulphite solutions.

International Specifications not yet Accepted

235,828. Obtaining Liquids from Coal. M. Melamid, 38, Riemeisterstrasse, Zehlendorf, Berlin. International Convention date, June 17, 1924.

Coal or lignite is heated in a protective atmosphere with a metal catalyst having a melting point below the reaction temperature. Liquids suitable for making fuels and lubricating oils are obtained. The coal may be atomised with water, mineral oils, tar oils, etc., by means of hydrogen, methane, steam, or other hydrogen-containing gas in a tin-lined vessel containing tin or tin alloy, heated to 300°–600° C.

235,844. Zinc Oxide. New Jersey Zinc Co., 160, Front Street, Manhattan, New York. Assignees of F. G. Breyer, and E. H. Bunce, Palmerton, Pa., U.S.A. International Convention date, June 17, 1924.

Zinc is volatilised and oxidised, and the resulting fume is treated with sulphur trioxide to form white compounds with impurities such as lead and cadmium. The sulphur trioxide or sulphuric acid mist may be introduced into the melting chamber or the oxidising chamber, or the fume settling chamber, or the re-heating chamber where the zinc oxide is heated to 450°–700° C.

235,860. Phosphate Fertilisers. Rhenania Verein Chemischer Fabriken Akt.-Ges., Mannheim, Germany. International Convention date, June 23, 1924.

A mixture of natural phosphate, alkali sulphate or chloride, silica, and an alkaline earth compound such as calcium

carbonate is heated in presence of steam to 900°–1,000° C. One molecule of alkali oxide must be present to each molecule of phosphorus pentoxide, and sufficient silica to form a silicate with all the calcium not combined with phosphoric acid. Alumina or iron oxide may be used in place of silica, and part or all of the steam may be omitted if a direct heating flame containing steam is employed. The product is a fertiliser containing calcium-alkali phosphate, all the phosphoric acid being citrate-soluble.

235,862. Dyes. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, June 17, 1924.

An *o*-oxyazo dye in which the second component is an aceto-acetic acid derivative is treated with an agent yielding chromium. Dyes derived from the following components are employed :—4-nitro-2-aminophenol or 4-chlor-2-aminophenol-6-carboxylic acid and ethyl acetoacetate, 4-nitro-2-aminophenol-6-sulphonic acid or 6-nitro-2-aminophenol-4-sulphonic acid and aceto-acetic anilide, 4-chlor-2-aminophenol-6-sulphonic acid and acetoacetic anilide, 4-nitro- or 4-sulpho-2-aminophenol-6-carboxylic acid and acetoacetic anilide or ethyl acetoacetate. These are treated with chromium formate or fluoride. Toluidides, anisidides, chlor- or nitro-anilides, or naphthylamides may be used in place of the anilide. *o*-Oxydiazo-naphthalene compounds may also be employed as components.

235,864. Organo-arsenic Compounds. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler, Frankfort-on-Main, Germany. International Convention date, June 18th, 1924. Addition to 199,092 (see The Chemical Age, Vol. VIII, p. 68).

The reaction of aliphatic-aromatic arseno compounds containing one or more side chain carbonyl groups with hydrazine derivatives of non-arsenical carbonyl compounds, transfers the hydrazine residue to the arseno compound and liberates the non-arsenical carbonyl compound. In an example, benzaldeyhde-arsinic acid is treated with acetone semicarbazone to obtain the semicarbazone of benzaldehyde-arsinic acid and acetone. In other examples, the hydrazone of *p*-acetophenone-arsinic acid, and the semicarbazone of *p*-acetophenone-arsinic acid are obtained.

235,867. Metaldehyde. Elektrizitätswerk Lonza, 72, Aeschenvorstadt, Basle, Switzerland. International Convention date, June 23, 1924.

Acetaldehyde is polymerised to metaldehyde, using as catalysts the neutral or acid salts of inorganic or organic nitrogen bases, or the corresponding phosphorus, arsenic, antimony, and bismuth compounds, or oxonium salts or the analogous sulphur compounds. Such catalysts include ammonium bromide, hydrazine chloride, pyridine hydrobromide and perbromide, halogenated pyridines, urea hydrochloride, diphenyl-thiourea hydrobromide, the hydrohalides of alkylamines and hexamethylene-tetramine, tetraethyl-ammonium trichloride, quinoline tribromoacetate, anisaldehyde hydrochloride, benzal-acetophenone hydrobromide, thiophene, and hydroxylamine or nitrilo-sulphonic acid with a strong mineral acid.

235,877. Dyes and Intermediates. Soc. of Chemical Industry in Basle, Switzerland. International Convention date, June 21, 1924. Addition to 210,413 (see The Chemical Age, Vol. X, p. 363).

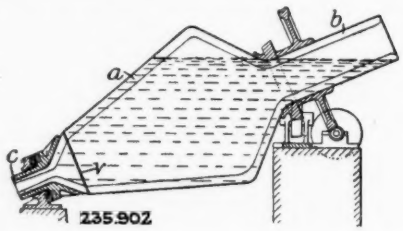
Aromatic nitroso compounds are condensed with 2 : 3-anthraquinone-oxythionaphthene or 2 : 3-anthracene-thionaphthene to obtain anils of 2 : 3-anthraquinone-thioisatin or 2 : 3-anthracene-thioisatin, *e.g.*, the *p*-dimethylaminoanils. These anils can be condensed with indoxyls, thioindoxyls, oxylthionaphthenes, acenaphthenones, or oxy compounds of the naphthalene or anthracene series to obtain thioindigoid dyes. In an example, the *p*-dimethylaminoanil of 2 : 3-anthraquinone-thioisatin is condensed with 2 : 3-anthraquinone-oxythionaphthene in pyridine or trichlorbenzene, or it may be condensed with oxythionaphthene carboxylic acid and the product brominated in sulphuric acid. In other cases the same anil is condensed with 2 : 3-anthraquinone-indoxyl, 1-oxyanthracene, oxythionaphthene carboxylic acid, or 6-chloroxythionaphthene carboxylic acid; and the *p*-dimethylaminoanil of 2 : 3-anthracene-thioisatin with oxythionaphthene carboxylic acid or its 6-chlor derivative, 2 : 3-anthraquinone-indoxyl, 2 : 3-anthraquinone-oxythionaphthene, 1-oxyanthracene, or 6-aminosalicyl-thioglycollic acid.

235,888. Indiarubber Latex. American Rubber Co., 130, Essex Street, Boston, U.S.A. Assignees of M. C. Teague, 561, West 58th Street, New York. International Convention date, June 18, 1924.

Rubber latex is thickened and stabilised for coating purposes by adding a thickening agent having also a coagulating action, such as sodium or potassium silicate. The coagulating action is neutralised by adding an anti-coagulant such as ammonia or a substituted ammonia.

235,902. Treating Solids with Liquids. A Ramen, Löfsta gard, Upsala, Sweden. International Convention date, June 20, 1924.

An apparatus for precipitating copper from solutions by means of iron comprises an inclined vessel *a* mounted on



trunnions *b*, *c*, which also form the inlet and outlet. The inlet *b* is above the liquid level, and a strainer *v* is provided at the outlet *c*, which also has a siphon or valve operated automatically by the pressure of the liquid.

Latest Notifications.

238,225. Manufacture of new vat dyestuffs. Society of Chemical Industry in Basle. August 9, 1924.

238,253. Process for the manufacture of celluloid-like masses from the esters or ethers of cellulose. Romahn, A. August 9, 1924.

Specifications Accepted with Date of Application

210,795. Iron Ores, Process of direct reduction of. T. Levy. February 1, 1923.

221,209. Alumina, Method of producing pure. R. Jacobsson. August 29, 1923.

225,206. Cyanamide from commercial calcium cyanamide, Process for the preparation of a solution of. Compagnie de l'Azote et des Fertilisants Soc. Anon. November 20, 1923.

227,837 and 237,779. Cement and iron, Processes of making. E. C. Eckel. January 14 and November 17, 1924.

235,227. Colloidal solutions, Production of. Siemens and Halske. Akt.-Ges. June 7, 1924.

237,659. Distilling ammonia liquor or benzolised oil or washing coal or other gases, Apparatus for. J. Barratt, W. H. Greaves, and Ashmore, Benson, Pease and Co., Ltd. May 6, 1924.

237,685. Alkali celluloses, Preparation of. Courtaulds, Ltd., and E. van Weyenbergh. May 30, 1924.

237,688. Aromatic hydrocarbons, Processes for the oxidation of derivatives of. E. B. Maxted and B. E. Coke. June 2, 1924.

237,716. Carbon disulphide, Process for producing. E. Legeler. July 11, 1924.

237,739. Dyeing acetyl silk. British Dyestuffs Corporation, Ltd., W. H. Perkin, and S. C. Bate. August 22, 1924.

237,757. Oil from oil-bearing sands, and similar materials, Process of extracting. H. Fairbrother. (*Jackson Research Corporation.*) September 22, 1924.

237,762. Nitrogen peroxide, Process for the manufacture of. Soc. d'Etudes Minières and Industrielles. September 18, 1924.

Applications for Patents

Badische Anilin- und Soda-Fabrik and Johnson, J. Y. Recovery of volatile substances. 20,286. August 12.

Badische Anilin- und Soda-Fabrik and Johnson, J. Y. Production of anthraquinone derivatives. 20,287. August 12.

Badische Anilin- und Soda-Fabrik and Johnson, J. Y. Manufacture of azo colouring-matters. 20,456. August 14.

Badische Anilin- und Soda-Fabrik and Johnson, J. Y. Manufacture of urea fertilisers. 20,457. August 14.

Badische Anilin- und Soda-Fabrik and Johnson, J. Y. Manufacture of intermediates of the bezanthrone series. 20,458. August 14.

British Dyestuffs Corporation, Ltd., and Hodgson, H. H. Manufacture of chloro- and nitro-chloro-derivatives of metahydroxybenzaldehyde. 20,364. August 13.

Dyer, Y. A. Reduction of oxide ores. 20,081. August 10.

Esling, F., and Wright, H. T. Conversion of heavy hydrocarbon oils into lighter hydrocarbon oils. 20,071. August 10.

Everest, A. E., and Leitch, J. W., and Co. Dyeing acetyl cellulose. 20,188. August 11.

Everest, A. E. and Leitch, J. W., and Co. Manufacture of nitro-derivatives of aromatic amines. 20,392. August 13.

Grasselli Chemical Co. and Marks, E. C. R. Crystallisation. 20,204. August 11.

Grasselli Chemical Co. and Marks, E. C. R. Continuous crystallising apparatus. 20,205. August 11.

Lever Bros., Ltd. Apparatus for separating liquids from materials. 20,178. August 11.

Lever Bros., Ltd. Glycerolates, etc. 20,521. August 15.

Millar, W. S. Desulphurisation, etc., of sulphide iron ores. 20,272. August 12.

Minerals Separation, Ltd. Separation of minerals by froth-flotation. 20,304. August 12.

Soc. des Etablissements Barbet. Rectification of acetic acid. 20,484. August 14. (France, August 14, 1924.)

Stoltzenberg, H. Production of coupling compounds of hydrocyanic acid and metal chlorides. 20,493. August 15.

New York Chemical Exposition

Comprehensive Programme of Exhibits

THE list of chemical and allied societies and associations which will meet in New York during the week of the Chemical Exposition, September 28 to October 3, continues to grow. In addition to the chemical industry banquet to be held under the auspices of a dozen or more organisations, individual meetings of a technical or business nature are being planned. The meetings which have been definitely scheduled, or are expected to be held, include an intersectional gathering of the American Chemical Society, meetings of the American Ceramic Society, Society of Chemical Industry, Technical Association of the Pulp and Paper Industry, the Salesmen's Association of the American Chemical Industry, National Association of Finishers of Cotton Fabrics, and the American Institute of Chemical Engineers. Others are expected to be added to this group before the beginning of September. The largest gathering of all will in all probability be the meeting of the eastern sections of the American Chemical Society. The fact that the annual meeting of the Society was held on the West Coast this year, cut down the attendance from the East to a normal extent, and it is expected that the meeting in New York during the Chemical Exposition will be largely attended. All sections east of the Mississippi are likely to be represented.

The National Association of Finishers of Cotton Fabrics will meet during the week, and will take up some of the following subjects: Bleaching cotton fibre, sizes in finishing, control of dye purchases, mercerisation, artificial silk and its relation to the textile industry, chemicals in cotton finishing, and others. Leading men in the chlorine field, starch and dextrin manufacture, and general chemical industry will address the gathering. Mill experts from all sections of the country will be represented.

The American Ceramic Society

The programme of the American Ceramic Society will consist of a general educational list of papers delivered by leading representatives of each group of the ceramic field, art, enamels, glass, heavy clay products, refractories, terra-cotta, and white wares. The urgent demand for better ceramic goods during recent years is to be the keynote of this meeting. Meeting competition from new developments outside of the ceramic field and improvement of qualities of all products as a means of preventing inroads by other goods will also be discussed at the meeting. Better ceramic education, especially opportunity for the men in the factories, and means of reducing costs are to be covered fully. Thursday, October 1, is to be Ceramic Day at the exposition.

Plans for the meeting of the Technical Association of the Pulp and Paper Industry have not yet been fully made up. The same applies to the Society of Chemical Industry. The meeting of the American Institute of Chemical Engineers will be held in the form of an independent banquet. The annual meeting and election of officers of the Salesmen's Association of the American Chemical Industry has been held during past years at a luncheon during the exposition week, and this policy will probably be pursued this year.

What will perhaps be the most extensive exhibition of rayon ever shown in America will be displayed at the exposition. The artificial silk industry through its various manufacturers is preparing a joint exhibit of all phases of rayon manufacture, as well as weaving, finishing, and dyeing. Four or five large booths in the exposition will be given over to the educational side, and the exhibit will be designed from the technical side for the textile expert and from the educational side for the layman.

Development in the Stinnes Crisis

Shares Offered for Wages

THE dismantling of Hugo Stinnes's industrial macrocosm is proving much more dramatic than its erection. The business king's eldest son has now astonished Germany by offering to the workmen of the embarrassed A.G.A. (Aktien Gesellschaft für Automobilbau) as a free gift one-half of his holding of shares in that concern. As 65 per cent. of the stock which he owns has a nominal value of 4,000,000 marks, the sum involved is a very large one. Dr. Stinnes, in a letter to the Press, has given his motives for this offer, according to a correspondent of *The Daily Telegraph*. He gives it as his belief that the refusal of the banks to lend more money to the A.G.A. is due to the personal reason that he is the owner of the majority of the shares, and that the necessary financial support will be more readily granted if he no longer controls the company.

However, before Dr. Stinnes took this step his position in his struggle with the banks had become rather critical. His appeal, backed by his workmen, to the Prussian Government for assistance to pay the wages due last week has so far met with no response, and under these circumstances it is not surprising that the workmen should be subjecting the gift horse's mouth to very careful examination. So far the works' council has not reacted to the proposal, but it is understood to incline towards acceptance and to be searching for a form under which the gift can be taken over without risk to the workmen.

Liabilities of the Concern

It is stated that the liabilities of the A.G.A. are 12,000,000 marks, of which about 7,000,000 fall due shortly. Against this must be placed stocks to a total of 9,250,000 and plant valued at 9,000,000. Some papers, however, suggest doubts as to whether the A.G.A. is in good hands, and it is recalled that until he left the family concern in May Dr. Stinnes was its financial chief, and was therefore "mainly responsible for its collapse." The difficulty of the A.G.A. in meeting its wage-bill has clearly illuminated the conflict between Dr. Edmund Stinnes and the combination of financiers which is liquidating his father's business realm. It now appears that he has already alienated a very considerable portion of what was assigned to him. Both the Nordstein Insurance Co. and the claim due only next year against his younger brother Hugo for 5,000,000 marks are understood to have been sold or pledged abroad, and naturally this will not improve the chances of closing the salvage work on the Stinnes estate with a handsome balance in hand. The collapse of the life-work of the industrial magician, in whom for some years the majority of his fellow-countrymen had an almost religious belief, has already done untold harm to Germany, and apparently the cost of it is still mounting.

It now appears that the commercial banks had announced a credit boycott against Dr. Stinnes because the apparently enormous assets of the concern had been badly over-valued, and it had become doubtful whether the debts would be covered. No further statement has yet been issued as to the course of the liquidation. The estimate of debts has risen very considerably; and the early belief that these debts could be covered three times over has proved unfounded—in part owing to the Bourse collapse, which is in turn partly an outcome of the concern's collapse. The Stinnes total interests so far sold have realised only 70,000,000 marks, although these interests constituted a great part of the concern. The Stinnes crisis is reported as having an unexampled effect upon business. It has shaken confidence, aggravated the credit crisis, and brought interest rates to about 2 per cent. higher than in the spring, and induced a remarkable Bourse crash, in which mining and metal stocks have fallen to around 40 per cent. of their quotations of last winter.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.*

London, August 20, 1925.

TRADE has been somewhat better this week and there appears to be a distinctly more hopeful feeling in the market. Of course, business is still somewhat restricted owing to the incidence of the holidays, but prices continue very firm and manufacturers are very loth to commit themselves to forward contracts at current figures. Export trade is still small but the inquiry is better and it is expected that the demand will expand in the near future.

General Chemicals

ACETONE.—The market is nominally unchanged and stocks are light; price is very firm at £76 to £77 per ton.

ACID ACETIC is in fair demand, price is unchanged at £38 per ton for the 80% technical and £1 per ton more for the pure.

ACID CITRIC.—The demand is disappointing but price continues firm at 1s. 5d. per lb., ex store.

ACID FORMIC has been in good request both for home and export account. Present value ex wharf is unchanged at £48 to £49 per ton for 85% technical.

ACID LACTIC.—Only a moderate demand is reported and the price continues very firm at £43 to £44 per ton for 50% by weight material.

ACID OXALIC.—Here again there is only a moderate demand but price is well maintained at 3¾ per lb.

ACID TARTARIC.—Only small business is reported and price is barely maintained at 11½d. per lb.

ALUMINA SULPHATE.—There is rather a poor inquiry and no change is to be noted in the current price of £6 5s. per ton.

ARSENIC continues idle and is in buyer's favour at £22 per ton.

BARIUM CHLORIDE has been in brisk demand for near delivery and price is firm at £9 per ton.

CREAM OF TARTAR.—A fairly active trade has been transacted and price is unchanged at from £74 to £77 per ton.

EPSOM SALTS.—Price is slightly higher at £5 per ton for imported material.

FORMALDEHYDE.—The slightly firmer position last noted continues but demand is still small. Supplies can be obtained at from £41 to £41 10s. per ton for spot.

LEAD ACETATE is brisk and the current quotation is £45 10s. for white and £43 10s. for brown.

LIME ACETATE has been in demand on export account and is quite firm at £16 per ton for grey.

METHYL ALCOHOL idle. Price nominally £48 per ton.

POTASSIUM CAUSTIC.—Unchanged.

POTASSIUM CHLORATE.—There has been no change in this position but spot stocks are still extremely light.

POTASSIUM PERMANGANATE has been in brisk request and price is firm at 7¾d. per lb.

POTASSIUM PRUSSIATE has been extremely brisk and the market is firm. Average price to-day is 7½d. per lb.

SODIUM ACETATE is in poor demand and price is about £18 per ton delivered buyer's works.

SODIUM BICHROMATE.—Unchanged.

SODIUM HYPOSULPHITE.—The keen demand for photographic quality continues but commercial is still slow of sale. Price is unchanged.

SODIUM PRUSSIATE continues firm and is quoted to-day at 4¼d. to 4½d. per lb.

SODIUM NITRITE.—Unchanged at £22 10s. per ton.

SODIUM SULPHIDE.—Unchanged in price with small demand.

ZINC SULPHATE.—Demand is quite good and market firm at £13 per ton.

Coal Tar Products

The market generally for coal tar products is fairly steady.

90% BENZOL.—Firm at 1s. 9d. to 1s. 10d. per gallon on rails.

PURE BENZOL.—Quoted at 1s. 11d. to 2s. per gallon on rails.

CREOSOTE OIL.—Firm at 5¾d. per gall. on rails in the North, and 7d. to 7¼d. per gall. in the South.

CRESYLIC ACID has little inquiry, and is quoted at 1s. 7d. to 1s. 8d. per gall. on rails for the pale quality 97/99%, while the dark quality 95/97% is quoted at 1s. 4d. per gall. on rails.

SOLVENT NAPHTHA is steady, and somewhat scarce for the near position. It is quoted at 1s. 4d. to 1s. 5d. per gall. on rails.

HEAVY NAPHTHA.—Quoted at 1s. 1d. per gall. on rails.

NAPHTHALENES are unchanged, the lower grades being worth from £3 to £3 15s. per ton, while the 74/76 quality is quoted at £5 to £5 10s. per ton, and the 76/78 quality at £5 15s. to £6 per ton.

PITCH.—Remains dull with little demand. Prices are unchanged.

Latest Oil Prices

LONDON.—Linseed oil weak at 7s. 6d. decline. Spot, £42 10s.; August to December, £41 7s. 6d.; January-April, £40 17s. 6d. Rape oil firm and dearer. Crude, crushed, spot, £49; technical, refined, £52. Cotton oil steady. Refined common edible, £50; Egyptian, crude, £45; deodorised, £52. Turpentine very firm and 9d. to 1s. per cwt. higher. American, spot, 70s. 6d.; September-December, 71s. 6d.; and January-April, 73s. 6d.

HULL.—Linseed oil, naked, £42; August, £41 5s.; September-December, £41 12s. 6d.; January-April, £41 2s. 6d. Cotton oil, naked Bombay crude, £41; Egyptian crude, £43 10s.; edible refined, £47 10s.; deodorised, £49 10s.; technical, £44. Palm kernel nut, crushed, naked, 5½ per cent., £43. Groundnut oil, crushed extracted, £48 10s.; deodorised, £52 10s. Soya oil, extracted and crushed, £42 10s.; deodorised, £45. Rape oil, extracted, £48 per ton net cash terms, ex mill. Castor oil and cod oil unaltered.

Nitrogen Products Market

Export.—During the last week there has been considerable demand for sulphate of ammonia in several countries and the market shows a firmer tendency. The internal price for the United States has been raised, and the French and Belgian demand has also taxed the capacity of these producers. As a consequence the British producers have raised their price for September shipment to £11 15s. per ton f.o.b. in single bags. The low summer prices at which producers were selling have had the desired effect of stimulating consumption, and it seems certain that producers will now have no difficulty in working to a rising scale of prices which will reach the peak for February/April delivery.

Home.—Home prices for delivery up to the end of November have previously been announced. The demand in the United Kingdom is small as is normal for this period of the year, but bookings ahead as far as November have been made and the producers' sales are well above those of the same period last year.

Nitrate of Soda.—The market has continued steady but little business has been done. Enquiries are being made for spring delivery, and these are keeping the market firm. No business for c.i.f. cargoes has been done, but the sellers are still holding for £11 5s., and buyers being unwilling to give more than £11 per ton, chief European ports.

Italian Chemical Industries

THE business and financial report of the Association of Italian Corporations states that during 1924 the output in the chemical industries increased, and trade, which opened dull, gradually showed signs of improvement. The general trend was in the direction of a rise in the cost of raw material, accompanied by a fall in the sales price of the products. Increased demand stimulated heavier production of all the acids; in the case of muriatic acid, however, the supply exceeded the demand. An important branch of the chemical industry is devoted to the production of fertilisers, more especially hypophosphates. The trade reports price depression for these, especially in the latter part of the year. The manufacture of synthetic ammonia and its by-products is now proceeding on a large scale, and the two leading companies manufacturing this commodity have installed large and up-to-date plants for this purpose.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.
Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.
Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d., according to purity, strength and locality.
Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.
Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight vaiations up and down owing to local considerations : 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.
Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.
Bleaching Powder.—Spot, £10 10s. d/d ; Contract, £9 10s. d/d. 4 ton lots.
Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.
Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)
Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.
Copper Sulphate.—£25 to £25 10s. per ton.
Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.
Nickel Sulphate.—£38 per ton d/d.
Nickel Ammonia Sulphate.—£38 per ton d/d.
Potash Caustic.—£30 to £33 per ton.
Potassium Bichromate.—5d. per lb.
Potassium Chlorate.—3⅞d. per lb., ex wharf, London, in cwt. kegs.
Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.
Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.
Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength ; 20s. less for contracts.
Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.
Sodium Acetate 97/98%.—£21 per ton.
Sodium Bicarbonate.—£10 10s. per ton, carr. paid.
Sodium Bichromate.—4d. per lb.
Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.
Sodium Chlorate.—3d. per lb.
Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.
Sodium Nitrite 100% basis.—£27 per ton d/d.
Sodium Phosphate, £14 per ton, f.o.r. London, casks free.
Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.
Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.
Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.
Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4⅝d. per lb. Slightly better demand. Crude 60's, 1s. 2d. to 1s. 3d. Little demand.
Acid Cresylic 97/99.—1s. 6d. to 1s. 9d. per gall. Pale, 95%, 1s. 5d. to 1s. 6d. per gall. Dark, 1s. 5d. per gall. Better demand.
Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.
Anthracene Oil, Strained.—7¾d. per gall. Unstrained, 7d. per gall. Nominal.
Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 1s. 9½d. to 2s. per gall., ex works in tank wagons.
Toluol.—90%, 1s. 8½d. to 1s. 9d. per gall. More inquiry. Pure, 1s. 9½d. to 2s. 2d. per gall.
Xylol Commercial.—1s. 9½d. to 2s. 3d. per gall. Pure, 3s. 3d. per gall.
Creosote.—Cresylic, 20/24%, 8½d. per gall. Standard specification, middle oil, heavy, 6d. to 6¾d. per gall. Steady demand for near delivery.
Naphtha.—Solvent 90/160, 1s. 5d. to 1s. 9d. per gall. Demand good. Solvent 90/190, 1s. to 1s. 4d. per gall. Fair demand.
Naphthalene Crude.—Drained Creosote Salts, £3 to £5 per ton. Market quiet. Whizzed or hot pressed. No demand.
Naphthalene.—Crystals and Flaked, £10 to £13 per ton, according to districts. Very quiet.
Pitch.—Medium soft, 40s. to 42s. 6d. per ton, according to district. Better inquiry.
Pyridine.—90/160, 19s. 6d. to 20s. per gall. Heavy, 11s. 6d. to 12s. per gall. Fair business.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.
Acid Anthranilic 7s. per lb. 100%.
Acid Benzoic 1s. 9d. per lb.
Acid H.—3s. 6d. per lb. 100% basis d/d.
Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.
Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.
Acid Sulphanilic.—9d. per lb. 100% basis d/d.
Aluminium Chloride, anhydrous.—10d. per lb. d/d.
Aniline Oil.—7d. per lb. naked at works.
Aniline Salts.—7d. per lb. naked at works.
Antimony Pentachloride.—1s. per lb. d/d.
Benzidine Base.—3s. 6d. per lb. 100% basis d/d.
Benzyl Chloride 95%.—1s. 1d. per lb.
p-Chlorphenol.—4s. 3d. per lb. d/d.
p-Chloraniline.—3s. per lb. 100% basis.
o-Cresol 29/31°.C.—3d. per lb. Demand quiet.
m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.
p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.
Dichloraniline.—2s. 3d. per lb.
Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.
Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.
Dimethylaniline.—2s. 1d. per lb. d/d. Drums extra.
Dinitrobenzene.—9d. per lb. naked at works.
Dinitrochlorbenzene.—£84 10s. per ton d/d.
Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.
Diphenylaniline.—2s. 10d. per lb. d/d.
G. Salt.—2s. 2d. per lb. 100% basis d/d.
a-Naphthol.—1s. 10d. per lb. d/d. Good home inquiry.
B-Naphthol.—1s. per lb. d/d. Good home inquiry.
a-Naphthylamine.—1s. 3d. per lb. d/d.
B-Naphthylamine.—3s. 9d. per lb. d/d.
m-Nitraniline.—3s. 9d. per lb. d/d.
p-Nitraniline.—1s. 11d. per lb. d/d.
Nitrobenzene.—5d. to 5½d. per lb. naked at works. Good home inquiry.
o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.
Nitronaphthalene.—10d. per lb. d/d.
p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.
p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.
m-Phenylene Diamine.—4s. per lb. d/d.
p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.
R. Salt.—2s. 4d. per lb. 100% basis d/d.
Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.
o-Toluidine.—10d. per lb.
p-Toluidine.—2s. 3d. per lb. naked at works.
m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £9 10s. to £10. Quiet market. Grey, £15 per ton. Liquor, 9d. per gall. 32° Tw.
Acetone.—£73 per ton.
Charcoal.—£7 5s. to £8 10s. per ton, according to grade and locality.
Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.
Red Liquor.—10d. to 1s. per gall. 14/15° Tw.
Wood Creosote.—2s. 9d. per gall. Unrefined.
Wood Naphtha, Miscible.—4s. 3d. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P.
Wood Tar.—£4 per ton.
Brown Sugar of Lead.—£43 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7¼d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.
Arsenic Sulphide, Yellow.—2s. per lb.
Barytes.—£3 10s. to £6 15s. per ton, according to quality.
Cadmium Sulphide.—4s. 4d. per lb.
Carbon Bisulphide.—£25 to £28 per ton, according to quantity.
Carbon Black.—5¼d. per lb., ex wharf.
Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.
Chromium Oxide, Green.—1s. 3d. per lb.
Diphenylguanidine, 4s. to 4s. 3d. per lb.
Indiarubber Substitutes, White and Dark.—5¾d. to 6¾d. per lb.
Lamp Black.—£43 per ton, barrels free.
Lead Hyposulphite.—9d. per lb.
Lithopone, 30%.—£22 10s. per ton.
Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.
Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 7d. to 2s. 9d. per lb. British makers meeting foreign competition in quality and price.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 3½d. to 1s. 4d. per lb., less 5%.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 2½d. to 1s. 3½d. per lb. Low price due to competition. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 8d. per lb.
Acid, Tartaric.—1s. 0¾d. per lb.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—13s. 3d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb. Lower owing to increased supplies.
Benzonaphthol.—3s. 6d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb. according to quantity.
} Prices advanced. Supplies of the metal somewhat easier.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 2s. to 2s. 1d. per lb.; sodium, 2s. 2d. to 2s. 3d. per lb.; ammonium, 2s. 4d. to 2s. 7d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 6½d. to 1s. 8d., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. 9d. per lb.
Formaldehyde.—£38 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. 3d. to 6s. 6d. per lb.
Hexamine.—2s. 4d. powder crystal, 2s. 6d. free running crystal, per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4¾d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £34 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £65 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £24 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 46s. 6d. per lb., less 2½% prompt delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 4½d. to 1s. 8d. per lb. British cheaper than imported.
Methyl Sulphonal.—17s. 6d. per lb. Demand limited.
Metol.—11s. per lb. British make.
Paraformaldehyde.—2s. for B.P. quality.
Paraldehyde.—1s. 4d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. perl b.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—74s. to 78s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 2d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—6d. to 7½d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7¾d. per lb., spot. Firmer.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923. 1s. 7d. to 1s. 8d. per lb., according to quantity. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—80s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 2d. per lb. Flake, 2s. 1d. to 2s. 4d. per lb.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. 3d. to 12s. 6d. per lb. Limited demand.
Thymol.—12s. 6d. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—10s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—5s. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 6d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 6d. per lb.
Benzaldehyde free from Chlorine.—3s. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural—15s. 6d. per lb.
Coumarin.—13s. per lb.
Citronellol.—19s. per lb.
Citral.—8s. 6d. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—27s. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—19s. 6d. per lb.
Linalyl Acetate.—18s. 6d. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—37s. 6d. per lb.
Musk Xylol.—9s. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—15s. per lb.
Phenyl Ethyl Alcohol.—13s. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 9½d. per lb.
Vanillin.—22s. 9d. per lb.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. 6d. per lb.
Bergamot Oil.—20s. per lb.
Bourbon Geranium Oil.—17s. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 4s. 11d.; Ceylon, 2s. 6d. per lb.
Clove Oil.—7s. 1d. per lb.
Eucalyptus Oil, 70/75%.—1s. 9½d. per lb.
Lavender Oil.—French 38/40% Esters, 27s. per lb.
Lemon Oil.—6s. per lb.
Lemongrass Oil.—4s. 6d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. No good quality material available. Japanese, 17s. 3d. per lb.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, August 20, 1925.

BUSINESS in the heavy chemical market has been rather quieter during the past week, and there is nothing of importance to record.

Industrial Chemicals

ACID ACETIC.—In moderate request and price unchanged. 98/100% glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports; 80% pure, £40 to £42 per ton; 80% technical, £39 to £41 per ton packed in casks c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton; powdered, £42 per ton, packed in bags carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Rather better inquiry, especially for export. Now quoted 4¾d. per lb. d/d or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb. less 5% ex store. Offered for early delivery at 1s. 4d. per lb. less 5% c.i.f. U.K. ports.

ACID FORMIC, 85%.—Spot material unchanged at about £48 10s. per ton ex store spot delivery. Offered for prompt shipment from the continent at £47 10s. per ton c.i.f. U.K. ports.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy ex works.

ACID NITRIC, 80°.—Usual steady demand quoted £23 15s. per ton ex station, full truck loads.

ACID OXALIC, 98/100%.—Spot material unchanged at 3½d. per lb. ex wharf. Offered for prompt shipment at a fraction less.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot material quoted 1s. per lb. less 5% ex store. Offered for early delivery at 11¼d. per lb. less 5% ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Spot lots quoted £6 10s. per ton ex store. Offered for prompt shipment from the continent at about £6 5s. per ton c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Offered for prompt shipment from the continent at about £8 per ton c.i.f. U.K. ports. Spot material available at £9 5s. per ton ex store.

AMMONIA ANHYDROUS.—Moderate demand and price unchanged at 1s. 4½d. per lb. less 5% ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton. Packed in 5 cwt. casks delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals quoted £28 per ton ex station. Offered from the continent at about £24 per ton c.i.f. U.K. ports. Fine white crystals quoted £19 10s. per ton c.i.f. U.K. ports.

ARSENIC.—Refined white Cornish arsenic quoted £24 10s. per ton ex wharf. Early delivery. Spot lots available at £25 10s. per ton ex store. Foreign arsenic now quoted £21 per ton c.i.f. U.K. ports.

BARIUM CARBONATE, 98/100%.—Offered from the continent at £7 15s. per ton c.i.f. U.K. ports.

BARIUM CHLORIDE, 98/100%.—Quoted £9 10s. per ton ex store, spot delivery. On offer from the continent at £8 5s. per ton c.i.f. U.K. ports.

BLEACHING POWDER.—Spot lots English material £10 10s. per ton ex station. Contracts 20s. per ton less. On offer from the continent at about £8 7s. 6d. per ton c.i.f. U.K. ports.

BARYTES.—English material unchanged at £5 5s. per ton ex works. Continental quoted £5 per ton c.i.f. U.K. ports.

BORAX.—Granulated £24 10s. per ton, crystals £25 per ton, powdered £26 per ton. Carriage paid U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. to £5 17s. 6d. per ton carriage paid U.K. stations. Continental slightly higher at about £4 2s. 6d. per ton c.i.f. U.K. ports.

COPPERAS, GREEN.—Now quoted £3 10s. per ton ex wharf, packed in casks.

COPPER SULPHATE.—Offered from the continent at about £21 15s. per ton c.i.f. U.K. ports. English material for export unchanged at about £24 10s. per ton f.o.b.

FORMALDEHYDE, 40%.—Offered for prompt shipment from the continent at £38 10s. per ton c.i.f. U.K. ports. Spot material available at about £39 10s. per ton ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton ex store or station. Continental quoted £2 17s. 6d. per ton c.i.f. U.K. ports.

LEAD, RED.—Imported material offered on spot at £44 per ton, ex store. Quoted £42 10s. per ton, c.i.f. U.K. ports for early arrival.

LEAD, WHITE.—Spot material available at £43 10s. per ton, ex store.

LEAD, ACETATE.—White crystals quoted £44 10s. per ton, spot delivery. Brown, £43 per ton, ex store. White crystals on offer from the continent at £43 15s. per ton, c.i.f. U.K. ports. Brown about £38 per ton, c.i.f. U.K. ports.

MAGNESITE.—Ground calcined. Usual steady demand and price unchanged at about £8 per ton, ex station.

POTASH, CAUSTIC, 88/92%.—Offered for prompt shipment at about £28 5s. per ton, ex wharf. Spot material quoted at about £30 per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption, 5d. per lb. delivered.

POTASSIUM CARBONATE, 96/98%.—Quoted £25 5s. per ton, c.i.f. U.K. ports. Spot material available at about £26 5s. per ton ex store.

POTASSIUM CHLORATE.—Some white powdered quality available at about £32 10s. per ton, c.i.f. U.K. port. Spot material quoted 4d. per lb., ex store.

POTASSIUM NITRATE (SALTPETRE), 99%.—Refined granulated quoted at about £24 10s. per ton, c.i.f. U.K. ports. Spot material quoted £27 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Slightly higher at 7¾d. per lb., ex store. Offered for early delivery at about 7¼d. per lb., ex store.

POTASSIUM PRUSSIATE, YELLOW.—Rather better inquiry now quoted 7¼d. per lb., ex store. Spot delivery. Offered for prompt shipment from the continent at about 7¼d. per lb., ex wharf.

SODA, CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton. Broken, 60%, £17 2s. 6d. per ton. Powdered, 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Spot material on offer at about £19 per ton, ex store. Quoted £17 5s. per ton, c.i.f. U.K. ports. Prompt shipment.

SODIUM BICARBONATE.—Refined recrystallised quality £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM CARBONATE.—Soda crystals £5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £9 10s. per ton, ex station. Pea crystals, £14 per ton, ex station. Continental on offer at about £9 5s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98%, refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE, 100%.—Quoted £24 per ton, ex store. Offered from the continent at about £22 5s. per ton, c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Now quoted 4d. per lb., ex store. In very moderate demand.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £3 10s. per ton, f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid, 60/62%, now £13 per ton. Broken, £14 per ton. Flake, £15 per ton. Crystals, £8 10s. per ton. Carriage paid U.K. stations, minimum 4 ton lots, with slight reductions for contracts to the end of the year. 60/62% Solid offered from the continent at £10 15s. per ton, c.i.f. U.K. ports. Broken, £1 per ton more. 30/32% Crystals, £7 15s. per ton, c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s. per ton; roll, £9 10s. per ton; rock, £9 7s. 6d. per ton; ground, £9 10s. per ton ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—100% quoted from the continent at £24 5s. per ton, c.i.f. U.K. ports. 97/98% of English manufacture on offer at £25 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Commercial crystals on offer from the continent at about £12 per ton, c.i.f. U.K. ports.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

TOLUIDINE.—Some home inquiries, 5s. 9d. per 100%.

BENZOIC.—Fair home inquiries, 1s. 9d. per lb.

DIMETHYLANILINE.—Fair home inquiries, 2s. 1d. per lb.

NAPHTHIONATE OF SODA.—Some home inquiries, 1s. 9d. per lb.

BETA NAPHTHALINE.—Some home inquiries, 3s. 10d. per lb.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, August 20, 1925.

Business in heavy chemicals on the Manchester market this week has not been characterised by much activity, and the aggregate has been at much about the level of the last few weeks. The holiday season, which has added to the trouble resulting from the restricted demands of the large consuming industries, is approaching its end, and in some quarters there is hope that an improvement will be noticeable next month. Whether or not this comes about remains to be seen. In the meantime, neither home nor export inquiries are very pressing.

Heavy Chemicals

Sulphide of sodium, 60/65 per cent. concentrated solid still quoted at round £12 15s. per ton and commercial quality at £9 5s., with the demand on a small scale. Prussiate of soda meets with a fair amount of inquiry and values are steady at about 4d. per lb. Bicarbonate of soda is maintained at £10 10s. per ton, but sales are rather slow. Saltcake is attracting very limited attention at about £3 12s. 6d. per ton. Glauber salts are quiet at about £3 10s. per ton. Caustic soda is unchanged from recent rates, quotations ranging from £15 12s. 6d. per ton for 60 per cent. strength to £18 for 76-77 per cent.; both on home and foreign account a quietly steady demand is being met with. Hyposulphite of soda is steady and in fair request; photographic crystals are quoted at round £14 per ton and commercial quality at £9 5s. Phosphate of soda continues to offer at £12 10s. to £12 5s ton, but little or no improvement can be reported. Sales of chlorate of soda are comparatively slow, though values are steady at 2¾d. to 3d. per lb. Acetate of soda is rather quiet but steadier again at round £18 per ton. Soda crystals meet with a fair demand at about £5 per ton. Alkali is well held at £6 15s. per ton and a quietly steady business is being transacted. Bleaching powder keeps rather quiet but there is no change in value, which continues at round £9 10s. per ton.

Among potash products caustic is rather a slow section of the market and values have a slightly easy tendency at £28 to £29 per ton. Carbonate of potash is well maintained at £25 to £25 10s. per ton for 96-98 per cent. quality. Chlorate of potash is steady and in moderate request at 3⅞d. per lb. Permanganate of potash is in quiet demand; pharmaceutical quality is currently quoted at 7¾d. to 8d. per lb. and commercial material at round 6¼d. Bichromate of potash has been in limited inquiry at 5d. per lb. Prussiate of potash is steady at 7d. to 7¼d. per lb., but the demand has been rather poor.

Arsenic continues dull and no improvement in the demand for this material has been reported; values still show a weak tendency, round £20 per ton being quoted in Cornwall and £24 to £25 in Manchester for white powdered, Cornish makes. Sulphate of copper keeps steady at about £24 10s. per ton, but business is still restricted. Nitrate of lead is quiet at £40 to £41 per ton. Acetate of lead is not too active, but at £44 per ton for white and £39 to £40 for brown material values are little changed from last report. Acetate of lime is in small demand, though prices are fairly steady at about £14 per ton for grey quality and £7 15s. to £8 for brown. Commercial Epsom salts are easy at round £4 per ton, with magnesium sulphate, B.P. quality, ranging from £5 5s. to £5 10s.

Acids and Tar Products

Oxalic acid still fails to attract much attention and prices are weak at 3½d. per lb. Citric acid is in small demand at 1s. 4d. per lb. Tartaric acid is quiet at 11¾d. to 1s. per lb. Acetic acid is in moderate request at round £38 per ton for 80 per cent. commercial quality and £67 for glacial.

The coal-tar products generally show little activity. Crystal carbolic acid is in limited request, though a little better than it has been, with quotations round 4½d. per lb.; crude is on offer at about 1s. 4½d. per gallon. Creosote oil is steady at 5¾d. to 6d. per gallon, with a moderate amount of business being done. Pitch is quiet and unchanged at 40s. per ton. Naphthalene is dull at £13 10s. for refined and £4 10s. and, upwards for crude. Solvent naphtha is quiet at 1s. 5d. to 1s. 6d. per gallon.

Pulverised Fuel Firing

Latest Methods for a New York Power Station

Pulverised fuel firing as applied to large water tube boilers continues to make remarkable progress (a correspondent writes) from the point of view both of extensive application and of scientific principles of design, and the enormous new East River Power Station for New York is a striking indication of both these tendencies.

The first 120,000 k.w. section is to be erected immediately by the New York Edison Co. at 14th Street and East River, and the installation will be eventually 700,000 k.w., at a cost of $50,000,000, one of the largest in the world. The consulting engineers are Messrs. Thomas E. Murray, Inc., of New York, and the equipment now on order comprises two 60,000 k.w. "General Electric" and 10 "Springfield" water tube boilers, operating under what may be termed conservative conditions of 375 lb. and 700° F. superheated steam temperature, whilst the pulverised fuel plant will be on the "Lopulco" principle throughout, a contract for nearly $1,000,000 having been placed with the Combustion Engineering Corporation, New York, for this part of the installation.

The designs will represent the latest scientific practice of pulverised fuel firing, comprising continuous self-contained coal driers on the simple vertical gravity principle. "Raymond" pulverisers, with automatic air separation of the particles when of correct size, cyclone separators, adjustable speed fuel feeders, triplex burners, "Usco" air heaters, water screens for the prevention of the slagging of the ash, and the "Murray" fin tube combustion chamber walls. The four walls of the large volume combustion chamber will be constructed of 4 in. "Murray" water-cooled steam tubes, with projecting fins welded down each side, which overlap one another, covering a 3 in. space between the tubes, whilst the water screen of similar water-cooled tubes at the bottom will complete the design. The combustion thus takes place in an enclosed box of tubes through which the feed water under full boiler pressure circulates, giving in this way an enormous increase in radiant heat absorbing surface.

It is well known that a heated air supply greatly improves the efficiency of combustion, and the hollow front firebrick combustion chamber wall, through which about 85 per cent. of the air was formerly passed, is now replaced by the air heater, which at the same time, as compared with the feed water economiser, is an equally or even more efficient method of recovering the heat in the waste gases. The "Usco" air heater is a British invention, and was originally introduced by the Underfeed Stoker Co., Ltd., of London, who have also the British rights for the "Murray" tube, which is the invention of Mr. Thomas E. Murray, and was first used at the Hell Gate Power Station, New York, about two years ago. Air heating for general furnace work, quite apart from boiler plants, large and small, is now making rapid progress, and is of particular interest for the operation of kilns, driers, roasters, and various other chemical plant.

Deterioration of Stored Cement

As the result of tests carried out over a period of several years by the Structural Materials Research Laboratory, Chicago, the rate of deterioration of cement with storage has been determined. The cement was stored in bags such as would be used by a contractor, and, taking the original compressive strength as 100, the relative strengths after periods of three, six, twelve, and twenty-four months were 80, 72, 60, and 46 per cent. respectively, so that after two years' storage the strength was reduced to less than one-half. On the other hand, it was found that concrete made with such deteriorated cement improved with age. Thus cement after three months' storage was used for a concrete which after seven days gave 73 per cent. of the strength of concrete made with fresh cement. After twenty-eight days, however, the figure had increased to 75 per cent., and it thus appears that a cement damaged by storage is slower in hardening than a fresh cement. Storage is accompanied by a smaller degree of deterioration, however, if the temperature of the cement is somewhat raised during the period which elapses between production and use, and when stored in mass in bins, cement shows little or no deterioration after a period of as much as one and a half years.

Company News

NORTH BROKEN HILL.—Dividend No. 63 of 2s. and a bonus of 2s., less tax, have been declared payable on September 30.

NEW TAMARUGAL NITRATE CO., LTD.—The local board in Chile have declared an interim dividend of 10 per cent. for the year to July 31 last.

CROSSLEY BROTHERS.—An interim dividend of 3½ per cent. on the preference shares for the half-year ended June 30 is payable on September 1.

UNITED TURKEY RED.—The directors announce an interim dividend of 3 per cent. actual on the ordinary shares, less tax, payable on September 8.

ENGLISH OILFIELDS, LTD.—At the annual meeting held on August 14, dissatisfaction was expressed with the financial report, and the meeting was adjourned for four months without this being adopted.

SAN PATRICIO NITRATE CO.—After providing for stoppage expenses, administration charges, income tax, and corporation tax, the profit for the year 1924 amounted to £5,299, making a credit balance of £12,824.

GOODLASS, WALL AND CO.—The profit for the past year, including £13,400 brought in, amounted to £50,969. A dividend of 10 per cent. is proposed on the ordinary shares, and £16,356 is carried forward.

INTERNATIONAL PAINT AND COMPOSITIONS CO.—The directors have declared the usual interim dividend of 3 per cent., less tax, on the preference shares, and 2 per cent. (same as last year) interim dividend, less tax, on the ordinary shares.

DIAMOND MATCH CO.—The gross earnings for the six months to June 30 last were $1,863,133. Taxation, depreciation, etc. amounted to $1,012,731, leaving a net profit of $850,402. The sum of $4,566,857, together with $4,395,060 brought in, is carried forward.

UNITED INDIGO AND CHEMICAL.—The directors recommend a final dividend of 2½ per cent. actual on the ordinary shares, and an additional dividend of 2½ per cent. on the ordinary and participating preference shares, making 7½ per cent. for the year. The sum of £13,275 is carried forward.

EASTMAN KODAK OF NEW JERSEY CO.—The following dividends have been declared payable on October 1: regular dividend of 1½ per cent. on the preferred stock, regular dividend of $1.25 per share on the common stock, and an extra dividend of $0.75 per share on the common stock.

SOUTH AFRICAN ALKALI CO.—The report of operations at the works for quarter ended June 30 states that the brine treated amounted to 1,782,000 gallons. Steady production of soda was maintained and resulted in a total output of 484 tons of soda ash, which is a record quarter's production. There has been a considerable increase in the sales of soda ash during the quarter, these amounting to 370 tons as against 193 tons in the March quarter. The experimental work undertaken in connection with a new process which seemed to offer possibilities of reduced costs has not met with the success which appeared possible.

B. LAPORTE, LTD.—The net profit for the year ended June 30 amounted to £17,716 (against £18,852 in 1923-24). It is proposed to write £1,000 off goodwill (the same), to transfer £500 to taxes suspense account (against £2,000), and to pay a dividend on the ordinary shares of 11 per cent. and carry forward £9,566. The sum of £1,500 having been placed from share premium account to reserve fund, in addition to the usual transfer from profit and loss—making the reserve fund £17,977—it is not proposed to make a further allocation to reserve this year. In anticipation of further expansion of the business, it is proposed to increase the nominal capital by the creation of 50,000 additional 7½ per cent. "B" preference shares of £1 each.

CALICO PRINTERS' ASSOCIATION, LTD.—The directors announce that, after providing for maintenance, depreciation, debenture interest, etc. the accounts for the year ended June 30 last show a net profit of £532,597. To this has to be added £167,708, the profit realised on the sale of the French works, together with the accumulated balances against loss on exchange, released by this transaction, which, with the £218,614 brought forward, makes a total to credit of the profit and loss account of £918,919. The directors recommend that £150,000 be placed to reserve; £100,000 to the employés' fund, and payment of an ordinary share dividend of 10 per cent. for the year, plus a bonus of 5 per cent. out of the surplus on the French transaction, making a total distribution of 15 per cent. for the year, leaving to be carried forward £216,503.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to September 19, 1925.

"HOB GOBLIN."

458,455. For cement for furnaces. The Graphite Oils Co., Ltd., Victoria Street, Grimsby, Lincolnshire, manufacturers. April 29, 1925.

"CELLUGLOS."

459,764. For chemical substances used in the manufacture of liquid celluloid enamel. Price and Sons, Ltd., 10 to 20, Fitzroy Place, Euston Road, London, N.W.1, manufacturers. June 16, 1925.

"CONSTALITE."

459,820. For paint pigments. The Cookson Produce and Chemical Co., Ltd., London House, 3, New London Street, London, E.C.3, merchants. June 17, 1925.

Tariff Changes

PALESTINE.—*The Board of Trade Journal* reports that it is proposed to prohibit the importation into and the manufacture and sale in Palestine of matches made with white phosphorus.

GERMANY.—The import of the following chemicals into Germany is permitted without licence as from August 14, 1925: Ammoniacal liquor; liquid ammonia; carnallite with not less than 9 but less than 12 per cent. of potassium oxide; crude salt with 12 to 17·9 per cent. of potassium oxide; fertilising salts with 18 to 42 per cent. of potassium oxide; waste salts, so-called Stassfurth salts, not mentioned elsewhere in the tariff; thornstone; sulphate of potash; copper sulphate; also sulphate of copper and sulphate of iron mixed; oxide of tin, hydroxide of tin, except that used for extraction; tartar emetic and other antimony preparations; white chalk, washed; chalk in dust or finely pulverised in any other manner; graphite, moulded (in tablets, lumps, etc.), or packed for retail sale; refined methyl alcohol; refined acetone; formaldehyde in aqueous solution (formalin, formol); acetaldehyde, paraldehyde; fireworks of all kinds, antimony, magnesium and zinc torches; albumen, dried, even if powdered; albuminous substances, animal and vegetable, not specified elsewhere in the tariff.

TURKEY.—The following medicinal preparations are now exempted from duty on importation into Turkey:—Neosalvarsan; potassium iodide; pure biodide, protiodide, salicylate and cyanide of mercury; radium.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

RED OXIDES, OCHRES AND CERAMIC ENAMEL COLOURS.—A Montreal company desire to communicate with British buyers of the above lines. Inquiries received at the office of the Trade Commissioner for Canada.

OILS, CHEMICALS, ETC.—A commission agent at Amsterdam is desirous of obtaining the representation in the Netherlands of British firms exporting edible oils and fats, and chemicals. (Reference No. 216.)

CHEMICALS, COLOURS AND VARNISHES.—Tenders are required in Belgrade for the above. (Reference No. 16,159 F.E.)

Chemical Effluents and City Sewage

DURING the course of an application by the Manchester Corporation to the Minister of Health for sanction to borrow £465,000 for purposes of sewage disposal in the townships of Davyhulme and Flixton, evidence was given by Dr. E. Ardern, consulting chemist to the Corporation, respecting waste effluents from dyestuffs and other chemical plants within the City. Mr. M. G. Weekes, M.Inst.C.E., and Dr. H. T. Calvert were the inspectors appointed by the Minister of Health to hold the inquiry on August 12.

Manchester Consulting Chemist's Views

Dr. Ardern stated that very large branches of the dyestuff industry had been established in the city, and that at least seven per cent. of the dry weather flow of sewage consisted of the waste effluents from various processes connected with the manufacture of dyestuffs. The consequence was that the sewage was always more or less highly coloured, and contained a great variety of chemical products, including intermediates, which had a definite inhibitory action on bacterial life. It was, therefore, not so simple a problem to purify the mixed city sewage received at the Davyhulme works as contrasted with the domestic sewage dealt with at the Withington works some distance away. The difficulty was reflected in the fact that the provision of aeration plant at Davyhulme was three times greater than that required at Withington. It was found that a large amount of the colouring matter was not removed in the purification process, but fortunately this did not materially interfere with the oxidation of the sewage matter *qua* sewage matter. Consequently, he believed it would be possible to produce effluents which would conform with the Mersey and Irwell Joint Committee's standard of purity, notwithstanding the fact that they might be from time to time decidedly coloured.

Waste Liquor from Sulphate Works

There was also to be dealt with much more than the normal proportion of waste liquor from sulphate plants. Not only did the Corporation work up the whole of their gas liquor in the area, but there were sulphate of ammonia and gas tar works in the city which took liquor from a considerable area around. There were also fat industries established in the district, one plant being a very large one. The city possessed a special Act which required such manufacturers to enter into a common law agreement, whenever they applied for connections to a sewer, by which they were required, before discharging their waste products, to remove the grosser suspended matters and acids which otherwise might constitute a source of danger or nuisance in the sewer.

Mr. Hugh Stowell, M.Inst.C.E., Chief Inspector of the Mersey and Irwell Joint Committee, in giving general support to the application, said that the Committee had always appreciated the very valuable pioneer work which had been done by the Manchester Corporation in the development of sewage disposal science. That work had been rendered all the more valuable by the open and free way in which the results had been published, as they were of world-wide importance. When the history of that development came to be written there would be found to be closely associated with it the names of Dr. Gilbert Fowler, Dr. E. Ardern, and Dr. Lockhart.

Trained Research Chemists

A RECENT report of the Research and Inventions Committee of the British Science Guild deals with the supply of trained scientific research workers and the utilisation of their services in the industry of the country. The opinion was expressed that British industry as a whole did not support research work as it ought, and attention was drawn to the amount of unemployment among recently trained research chemists.

The German Chemical Society has lately circulated a warning on the excessive number of young chemists sent out by the universities at the present time. It is estimated that this year the chemical graduates will number about 1,100, and of these it is pointed out that only some 350 are likely to be absorbed by the native industry; formerly many opportunities existed abroad for German chemists, but since the war these have been greatly curtailed. The German Chemical Society also expressed the view that German industry does not avail itself of the help of chemical science as much as it should do, and that in many important branches of industry which might profit by applied chemistry the scientist was quite inadequately represented.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BRITISH CYANIDES CO., LTD., London, W.C. (M., 22/8/25.) Registered August 4, £5,000 debenture to Bishopsgate Nominees, Ltd., 15, Bishopsgate, E.C.; charged on freehold land at Oldbury, and all other freehold, leasehold and copyhold property of company; also general charge. *Nil. October 29, 1924.

DRUG AND CHEMICAL CORPORATION, LTD., London, E.C. (M., 22/8/25.) Registered August 11, £700 Land Registry charge, to Miss H. C. M. Brown, c/o National Provincial Bank, Ltd., Northampton; charged on property in Lamb and Hareyard at rear of 37, Lower Kennington Lane, S.E. *£1,750. December 31, 1924.

FISON (JOSEPH) AND CO., LTD., Ipswich, fertiliser manufacturers. (M., 22/8/25.) Registered August 5, £21,000 debentures part of amount already registered; charged on freehold fertiliser works and premises at Bramford, Ipswich, also general charge. *£30,000. March 26, 1925.

PARROTTS', LTD., Bishop's Stortford, manufacturing chemists. (M., 22/8/25.) Registered August 5, £300 debenture to Kate Parrott, 5, High Street, Bishop's Stortford, wife of Wm. Parrott; general charge.

London Gazette, &c.

Company Winding Up Voluntarily

RENNACID CASEIN, LTD. (C.W.U.V., 22/8/25.) At an Extraordinary General Meeting of the members of the above company on July 23, a Special Resolution to wind the company up voluntarily was duly passed; and at a subsequent Extraordinary General Meeting duly convened and held at 11, Poultry, London, E.C.2., on August 13, the said Special Resolution was duly confirmed, and E. V. Amsdon, Auditor, 22, Walbrook, London, E.C.4, appointed liquidator.

Receivership

ASHBY SOAPS, LTD. (R., 22/8/25.) T. R. Gleaves, of 51, Wardwick, Derby, was appointed Receiver and Manager on July 31, 1925, under powers contained in first mortgage debenture dated September 27, 1923.

New Companies Registered

ANGLO-POLISH CHEMICAL SYNDICATE, LTD. To manufacture synthetic ammonia, nitrogenous fertilisers and other chemical, agricultural and industrial products. Nominal capital, £10,000 in £1 shares. Solicitors: Lewis and Yglesias, 6, Old Jewry, London, E.C.2.

BRITISH PURE OIL, GREASE AND CARBIDE CO., LTD., Portwall Lane, Bristol. Grease and carbide merchants, manufacturers, etc. Nominal capital, £100 in 10s. shares.

CARBON PRODUCTS, LTD., 3, All Souls Place, Langham Place, Regent Street, London. Manufacturers of and dealers in any products or commodities that can be manufactured from carbon, etc. Nominal capital, £10,000 in 1s. shares.

FIRWOOD PAINT AND VARNISH CO., LTD., 162, Tonge Moor Road, Bolton. Manufacturers and dealers in paints, varnishes, oils, colours, enamels, chemicals, etc. Nominal capital, £1,000 in £1 shares.

NEO-CHEMICALS, LTD., 7, Chapel Street, Holborn, London. To deal in chemical or other preparations. Nominal capital, £1,000 in £1 shares.